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THE

AMERICAN EPHEMERIS

AND

NAUTICAL ALMANAC

FOR THE YEAR

1917

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NOTE.—Those whose names are printed in italics devote only a small portion of their time to work of th Almanac Office.

October, 1914.

PREFACE.

This volume of the *American Ephemeris and Nautical Almanac* ıs prepared under the immediate supervision of Professor W. S. CHELBERGER, U. S. N., the Director. The character of the matter rein contained and its arrangement are the same as in the preceding ılume.

This is the second volume to be issued under the international greement resulting from the *Congrès International des Éphémérides stronomiques* held at Paris in October, 1911.

The naval appropriation bill approved August 22, 1912, conıined the following:

> The Secretary of the Navy is hereby authorized to arrange for the change of data with such foreign almanac offices as he may from time to me deem desirable, with a view to reducing the amount of duplication of ork in preparing the different national nautical and astronomical almanacs ıd increasing the total data which may be of use to navigators and astronoıers available for publication in the American Ephemeris and Nautical lmanac: *Provided,* That any such arrangement shall be terminable on one ear's notice: *Provided further,* That the work of the Nautical Almanac Office during the continuance of any such arrangement shall be conducted so hat in case of emergency the entire portion of the work intended for the use f navigators may be computed by the force employed by that office, and rithout any foreign cooperation whatsoever: *Provided further,* That any mployee of the Nautical Almanac Office who may be authorized in any ınnual appropriation bill and whose services in whole or in part can be pared from the duty of preparing for publication the annual volumes of the merican Ephemeris and Nautical Almanac may be employed by said office n the duty of improving the tables of the planets, moon, and stars, to be ised in preparing for publication the annual volumes of the office: *Provided urther,* That section four hundred and thirty-five, Revised Statutes, is hereby epealed.

The volume, as in previous years, is divided into three parts, as follows:

Part I, *Ephemeris for the Meridian of Greenwich,* which gives the ephemerides of the Sun and Moon, the geocentric and heliocentric positions of the major planets, and other fundamental astronomical lata for equidistant intervals of Greenwich mean time.

Part II, *Ephemeris for the Meridian of Washington,* which giv ephemerides of 825 stars, Sun, Moon, and major planets, for tran over the meridian of the Naval Observatory, Washington, whi passes midway between the West and East Transit Circles of t Observatory. The mean places of the fixed stars and the data their reduction are also included in Part II.

Part III, *Phenomona,* which contains predictions of phenome to be observed, with data for their computation. Greenwich me time is used throughout this part except with the occultatic visible at Washington where Washington time is used. Tables the determination of latitude and azimuth from Polaris, tables the conversion of time, and an alphabetical list of observatories, w their latitudes, longitudes, and other data, are contained in this pa

The Greenwich ephemerides of the Sun, Moon, Venus, Ma Jupiter, Saturn, Uranus, and Neptune were furnished by the off of the British *Nautical Almanac.*

The Greenwich ephemeris of Mercury, the elements of Satur rings, the elongations of Saturn's satellites, and the apparent pla for Greenwich transit of 518 ten-day stars were furnished by the off of the *Berliner Jahrbuch.*

The conjunctions, phenomena, and configurations of Jupite satellites I–IV and the apparent places for Greenwich transit of circumpolar stars were furnished by the office of the *Connaissance Temps.*

The apparent places for Greenwich transit of 121 ten-day st were furnished by the office of the *Almanaque Nautico.*

The apparent places for Greenwich transit of 137 ten-day st were furnished by the office of the *Annuario Astronomico di Tori*

In accordance with the recommendations of the *Congrès Intern tional des Éphémérides Astronomiques,* most of the material furnish from abroad is based upon tables prepared in the American Nauti Almanac Office. In the Introduction are mentioned the vari tables upon which the different ephemerides are based.

The following computations were made by the American Na tical Almanac Office:

In Part I, all the hourly and daily variations for the quantit furnished from abroad except in the case of the right ascension a declination of the Moon.

In Part II, the quantities used in computing the apparent pla of the stars from their mean places; the mean place list; the int polation of the apparent places of 814 stars from transit at Greenwi

to transit at Washington; the apparent places of 11 stars; the interpolation of the ephemerides of the Sun, Moon, and planets from Greenwich noon to transit at Washington; the stellar magnitudes of the planets.

In Part III, the data relating to the eclipses of the Sun and Moon; the data relating to the occultations of stars by the Moon; the ephemerides for physical observations of the Sun, Moon, Mars, and Jupiter; the elements of the illuminated disks of Mercury and Venus; the stellar magnitudes of the planets; the data concerning the satellites of Uranus, Neptune, the fifth, sixth, and seventh satellites of Jupiter, and the ninth satellite of Saturn; the diagrams of all the satellite orbits; the position angle and distance tables of the satellites of Saturn; the list of phenomena; the list of observatories with their geographical coordinates; and the tables for the determination of latitude and azimuth from observations of Polaris.

All computations made in the American Nautical Almanac Office and those received from the other offices were subjected to checks to insure absence of errors.

J. A. HOOGEWERFF,
Captain, U. S. Navy,
Superintendent Naval Observatory.

U. S. Naval Observatory, *October, 1914.*

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INTRODUCTION.

The ephemeris of the Sun is constructed from NEWCOMB's *Tables of the* *ın, Astronomical Papers of the American Ephemeris*, Vol. VI, part 1.

The adopted value of the mean equatorial horizontal parallax of the Sun 8″.80, *Paris Conference, May, 1896.*

The Sun's rectangular equatorial coordinates are computed from the longi- ıdes and latitudes by the following formulæ:

$$X = R \cos \lambda$$
$$Y = R \sin \lambda \cos \omega - 19.3\, R\beta$$
$$Z = R \sin \lambda \sin \omega + 44.5\, R\beta$$

The reductions to mean equinox are computed by the formulæ—

$$\Delta X = +Y \sec \omega\, \Delta\lambda \sin 1''$$
$$\Delta Y = -X \cos \omega\, \Delta\lambda \sin 1'' + Z\Delta\omega \sin 1'' + 9.1\, \tau R \sin(\lambda + 6^\circ)$$
$$\Delta Z = -X \sin \omega\, \Delta\lambda \sin 1'' - Y\Delta\omega \sin 1'' - 21.0\, \tau R \sin(\lambda + 6^\circ)$$

'here the numerical coefficients are in units of the seventh place of decimals nd

R=the Sun's distance from the Earth,
λ=the Sun's true longitude,
β=the Sun's true latitude, expressed in seconds of arc,
ω=the obliquity of the ecliptic,
$\Delta\lambda$=the reduction of longitude for precession and nutation from the beginning of the Besselian fictitious year,
$\Delta\omega$=the reduction of the mean to the apparent obliquity,
τ=the fraction of the year since the beginning of the Besselian fictitious year.

The longitude, latitude, and parallax of the Moon are derived from HAN- EN's *Tables de la Lune* (London, 1857), the mean longitude being corrected as ı previous years, beginning with the volume for the year 1883. The state- ıent concerning these corrections which is contained in the volumes from 1883 o 1911, inclusive, is erroneous, in that they have not been computed strictly ı accordance with the formula in NEWCOMB's *Researches on the Motion of the Moon*, part 1, page 268, *Washington Observations*, 1875, Appendix II. That ormula is,

$$-1''.14 - 29''.17\, T - 3''.86\, T^2 - V_2 - 0''.09 \sin A - 15''.49 \cos A,$$

'hile the expression actually used is,

$$-1''.14 - 29''.17\, T - 3''.76\, T^2 - V_2 - 15''.49 \cos A.$$

In these formulæ T is the time in units of 100 years reckoned from 1800.

The ephemerides of Mercury, Venus, and Mars are derived from NEW- OMB's tables of these planets, *Astronomical Papers of the American Ephemeris*, ol. VI, parts 2, 3, and 4.

The ephemerides of Jupiter and Saturn are derived from the tables con- ructed in this office by GEORGE W. HILL, *Astronomical Papers of the American phemeris, Vol. VII, parts 1 and 2.*

The ephemerides of Uranus and Neptune are derived from Newco tables of these planets, *Astronomical Papers of the American Ephemeris*, VII, parts 3 and 4.

The nutation used in computing the ephemerides of the Sun, Moon, planets has been taken from Tables XXXII and XXXIII of Newco *Tables of the Sun, Astronomical Papers of the American Ephemeris*, Vol. part 1. The formulæ from which this nutation is computed are as follows time interval T being expressed in units of 100 years, reckoned from 1 See *Tables of the Sun*, page 26.

$$
\begin{aligned}
\delta\psi = &-(17''.234+0''.017\,T)\sin\Omega \\
&+\ 0''.209\sin 2\,\Omega \\
&-\ 1''.257\sin 2\,L \\
&-\ 0''.049\sin(3\,L+78^\circ.7) \\
&+\ 0''.110\sin(L+75^\circ.3)
\end{aligned}
\qquad
\begin{aligned}
\delta\epsilon = &+9''.214\cos\Omega \\
&-0''.090\cos 2\,\Omega \\
&+0''.546\cos 2\,L \\
&+0''.021\cos(3\,L+78^\circ.7) \\
&-0''.009\cos(L-78^\circ.7)
\end{aligned}
$$

The formulæ for the nutation used in computing the Besselian and I pendent Star Numbers are as follows:

Terms of Long Period.

$$
\begin{aligned}
\delta\psi = &-(17''.234+0''.017\,T)\sin\Omega \\
&+\ 0''.209\sin 2\,\Omega \\
&-\ 1''.272\sin 2\,L \\
&+\ 0''.126\sin(L-\Gamma) \\
&-\ 0''.050\sin(3\,L-\Gamma) \\
&+\ 0''.021\sin(L+\Gamma) \\
&+\ 0''.012\sin(2\,L-\Omega)
\end{aligned}
$$

$$
\begin{aligned}
\delta\epsilon = &+\ (9''.210+0''.0009\,T)\cos\Omega \\
&-\ 0''.090\cos 2\,\Omega \\
&+\ 0''.551\cos 2\,L \\
&+\ 0''.022\cos(3\,L-\Gamma) \\
&-\ 0''.009\cos(L+\Gamma) \\
&-\ 0''.007\cos(2\,L-\Omega)
\end{aligned}
$$

Terms of Short Period.

$$
\begin{aligned}
&-0''.204\sin 2\,☾ \\
&+0''.011\sin(☾+\Gamma') \\
&+0''.068\sin(☾-\Gamma') \\
&-0''.034\sin(2\,☾-\Omega) \\
&-0''.026\sin(3\,☾-\Gamma') \\
&+0''.015\sin(☾-2\,L+\Gamma') \\
&+0''.006\sin 2\,(☾-L)
\end{aligned}
$$

$$
\begin{aligned}
&+0''.088\cos 2\,☾ \\
&+0''.018\cos(2\,☾-\Omega) \\
&+0''.011\cos(3\,☾-\Gamma') \\
&-0''.005\cos(☾+\Gamma')
\end{aligned}
$$

The meaning of the symbols used and the manner in which these l formulæ have been employed in computing the ephemerides of the stars explained on pages 200 and 201. The slight discrepancy between the t in 2 L in these two sets of formulæ is due to the correction of an error in first set. See *Bulletin Astronomique*, 1898, Vol. XV, page 244.

The list of 825 stars contained in Part II has been selected from N comb's *Catalogue of Fundamental Stars, Astronomical Papers of the Amer Ephemeris*, Vol. VIII, part 2.

In general, the names of the stars are the same as in Newcomb's gested List of Fundamental Stars, except that the Flamsteed number been omitted in all cases where Greek or italic letters are available. In s cases the constellation and number of the uranometries of Heis or Gc have been used. In all such cases, H[1] or the letter G precedes the const tion name, as, for example, 5 H[1]. Cassiopeiæ and 38 G. Horologii.

The magnitudes of the stars have, with a few exceptions, been taken f *Annals of the Harvard College Observatory*, Vol. L, 1908.

The spectral classification has been furnished by the Harvard Co Observatory. The notation is that of *Annals of Harvard College Observa Vol. LVI.*

The mean places, annual variations, and annual proper motions of the stars have been taken from NEWCOMB's Catalogue, except that those of ϵ Hydri, 38 G. Horologii, and π Centauri have been taken from *Veroeffentlichungen des Koeniglichen Astronomischen Rechen-Instituts zu Berlin*, 1907, No. 33.

The values of $\Delta\alpha$ and $\Delta\delta$ which are given for the companions to the stars γ Andromedæ, α^1 Crucis, ζ^1 Ursæ Majoris and 61 Cygni, have been taken from Boss's *Preliminary General Catalogue*, and those for α^2 Geminorum from DOBERCK's elements given in the *Astronomische Nachrichten*, 1904, vol. 166, page 145.

The formulæ for the computation of the Besselian and Independent Star Numbers are given on page 200, the coefficients being those given by NEWCOMB in *Bulletin Astronomique*, 1898, Vol. XV, page 241.

The terms of short period of the nutation, depending on the Moon's mean longitude, have been computed from the formulæ for these terms given above.

The method by which the right ascensions and declinations of the stars interpolated from the 10-day ephemerides are corrected for the effect of these short-period terms is given on page 201.

According to the formulæ on pages 200 and 201 the star constants $a, b, c, d, a', b', c', d'$ are computed for each star from its mean place at the beginning of the year, but if strict accuracy is required they should be computed from the star's mean place at date, and the following second-order terms should be added to the usual expressions for the reduction from mean to apparent place, namely—

To $\alpha-\alpha_0$

$$\begin{array}{l}
\left.\begin{array}{l}
\overset{s}{+0.000\,003}\ \tau^2 \sin\alpha \\
-0.000\,149\ \tau^2 \cos\alpha
\end{array}\right\} \tan\delta \\
\left.\begin{array}{l}
-0.000\,0650\ \tau^2 \sin 2\alpha \\
+0.000\,0103 \sin 2\,\Omega \cos 2\alpha \\
-0.000\,0107 \cos 2\,\Omega \sin 2\alpha
\end{array}\right\} \tan^2\delta \\
\left.\begin{array}{l}
+0.000\,0620 \sin 2\odot \cos 2\alpha \\
-0.000\,0622 \cos 2\odot \sin 2\alpha
\end{array}\right\} \sec^2\delta \\
\left.\begin{array}{l}
+0.000\,0513 \sin(\odot+\Omega) \cos 2\alpha \\
-0.000\,0507 \cos(\odot+\Omega) \sin 2\alpha \\
+0.000\,0097 \sin(\odot-\Omega) \cos 2\alpha \\
-0.000\,0053 \cos(\odot-\Omega) \sin 2\alpha
\end{array}\right\} \tan\delta \sec\delta
\end{array}$$

To $\delta-\delta_0$

$$\begin{array}{l}
\left.\begin{array}{l}
\overset{''}{+0.000\,975}\ \tau^2 \sin^2\alpha \\
-0.000\,023 \cos 2\,\Omega \\
-0.000\,080 \cos 2\,\Omega \cos 2\alpha \\
-0.000\,077 \sin 2\,\Omega \sin 2\alpha \\
+0.000\,040 \cos 2\odot \\
-0.000\,467 \cos 2\odot \cos 2\alpha \\
-0.000\,465 \sin 2\odot \sin 2\alpha
\end{array}\right\} \tan\delta \\
\left.\begin{array}{l}
-0.000\,039 \cos(\odot+\Omega) \\
-0.000\,380 \cos(\odot+\Omega) \cos 2\alpha \\
-0.000\,385 \sin(\odot+\Omega) \sin 2\alpha \\
-0.000\,380 \cos(\odot-\Omega) \\
-0.000\,040 \cos(\odot-\Omega) \cos 2\alpha \\
-0.000\,072 \sin(\odot-\Omega) \sin 2\alpha
\end{array}\right\} \sin\delta \tan\delta
\end{array}$$

These terms are negligible for stars whose declination is numerically less than 80°, but in computing the apparent places given in the American Ephemeris they have been applied whenever sensible.

The *apparent* places of seven stars have been corrected for the effect of annual parallax. These stars, with the adopted values of the annual parallax, are—

	''		''
τ Ceti	0.31	α Centauri	0.75
ϵ Eridani	0.32	α Aquilæ (Altair) . .	0.23
α Canis Majoris (Sirius) . .	0.38	61 Cygni	0.30
α Canis Minoris (Procyon) .	0.33		

The *apparent* places of α Canis Majoris (Sirius), α Canis Minoris (Procyon), and α^2 *Centauri have been corrected* for the effect of orbital motion. AUWERS's

elements were used for Sirius and Procyon, and SEE's elements for α^2 Cent
The values of these corrections are given on pages 98 and 99 of *Veroeffent ungen des Koeniglichen Astronomischen Rechen-Instituts zu Berlin*, 1907, No but those for Sirius and Procyon need an additional correction to refer the the center of the orbit before they are applicable to the mean places taken f NEWCOMB's Fundamental Catalogue. These additional corrections for Si and Procyon were omitted in the *Star List of the American Ephemeris* [*Sup ment to the American Ephemeris and Nautical Almanac*] for 1910 and 1911, in the *American Ephemeris and Nautical Almanac* for 1912 and 1913. values of the corrections for the three stars are—

	Sirius.		Procyon.		α^2 Centauri.	
	1917.0	1918.0	1917.0	1918.0	1917.0	1918.0
$\Delta\alpha$	$-0^s.143$	$-0^s.143$	$-0^s.062$	$-0^s.061$	$+0^s.647$	$+0^s.634$
$\Delta\delta$	$-0''.59$	$-0''.72$	$+0''.05$	$+0''.18$	$+5''.98$	$+5''.70$

These corrections have not been applied to the mean places as publishe this volume.

The stars occulted by the Moon have been selected from the *Catalog Zodiacal Stars* contained in Vol. VIII, part 3, *Astronomical Papers o American Ephemeris*, and the mean places for 1917.0 have been derived f the same catalogue.

In Part III the elements of eclipses of the Sun and occultations of s by the Moon are given in accordance with BESSEL's method, the special fo employed being a modification of those developed in CHAUVENET's *Sphe and Practical Astronomy*.

In the computation of the elements of Eclipses, the following correct to the longitude, latitude, and parallax of the Moon, deduced by NEWC from recent observations of occultations of stars by the Moon, *Astronom Papers of the American Ephemeris*, Vol. IX, part 1, have been applied. T corrections have been assumed in each case to be constant during the ecli

G. M. T. 1917	δv	δb	$\delta \pi$
	$''$	$''$	$''$
Jan. 7^d 20^h	+8.4	+1.3	+0.40
Jan. 22 20	+7.6	0.0	+0.50
June 19 1	+6.3	+1.3	+0.43
July 4 10	+7.0	0.0	+0.48
July 18 15	+6.6	+1.6	+0.41
Dec. 13 21	+7.5	−0.1	+0.46
Dec. 27 22	+7.8	+1.4	+0.44

The elongations of the satellites of Mars are derived from elements g by H. STRUVE in *Sitzungsberichte der Königlich Preussischen Akademie Wissenschaften*, 1911, page 1073.

The conjunctions and phenomena of Jupiter's four brighter satellites derived from SAMPSON's tables. The configurations are derived from a tinuation of DAMOISEAU's tables by M. POTTIER.

The elongations of the Vth satellite of Jupiter are derived from un lished elements deduced from the observations of BARNARD.

The differential coordinates of Jupiter's VIth and VIIth satellites derived from elements and tables given in *Lick Observatory Bulletin*, 1 Vol. IV, No. 112, and in *Astronomische Nachrichten*, 1907, Vol. 174, page *respectively*.

The positions of the rings and the elongations and conjunctions of the satellites of Saturn are derived from elements given by H. STRUVE in *Observations de Poulkova*, Supplement 1, St. Petersburg, 1888; *Publications de Poulkovo*, Second Series, Vol. XI, St. Petersburg, 1898; with corrections communicated by H. STRUVE to the *Berliner Jahrbuch*. The differential coordinates of Phœbe are derived from elements and tables given in *Annals of Harvard College Observatory*, 1905, Vol. LIII, No. VI.

The apparent outer dimensions (a and b) of the rings of Saturn are also according to STRUVE; the relative dimensions of the rings are computed from BESSEL's data, except those for the dusky ring, which are based on the observations of various astronomers.

The elongations of Ariel and Umbriel, the inner satellites of Uranus, are derived from the data of NEWCOMB's *Uranian and Neptunian Systems, Washington Observations*, 1873, Appendix I. The elongations of Titania and Oberon, the outer satellites of Uranus, are derived from elements given by H. STRUVE in *Abhandlungen der K. Preussischen Akademie der Wissenschaften*, 1912.

The elongations of the satellite of Neptune are derived from elements given by A. HALL in the *Astronomical Journal*, 1898, Vol. XIX, page 65.

The adopted apparent semidiameter of the Sun at the Earth's mean distance is 16′ 1″.50, while in the computation of eclipses the value given by AUWERS in the *Astronomische Nachrichten*, 1891, Vol. 128, page 367, is employed, viz., 15′ 59″.63.

In the computation of the ephemeris for physical observations of the Sun the following elements by CARRINGTON have been used:

Inclination of the Sun's equator to the ecliptic	7° 15′
Longitude of the ascending node of the Sun's equator on the ecliptic	73° 40′+50″.25 (t−1850)
Sidereal period of rotation (mean solar days)	25^d.38

The apparent semidiameter of the Moon is computed from the Moon's equatorial horizontal parallax, π, by the formula,

$$S = 0.272\,506\,\pi + 1''.50$$

where the constant 0.272 506 is based on data from occultations given by J. PETERS in the *Astronomische Nachrichten*, 1895, Vol. 138, page 147; and the constant 1″.50 is added to cover the average effect of irradiation.

The value of the Moon's semidiameter employed in the computation of eclipses is computed from the formula,

$$\sin S = 0.272\,274 \sin \pi$$

In the computation of the ephemeris for physical observations of the Moon, the following notation and formulæ have been used, the value of I and the formulæ for physical libration being those given by F. HAYN in *Abhandlungen der K. Sächsischen Gesell. der Wissenschaften*, Vols. 29 and 30, 1904, 1907:

I = the inclination of the Moon's mean equator to the ecliptic (= 1° 32′.1),

Ω = the longitude of the ascending node of the Moon's orbit, or the longitude of the descending node of the Moon's mean equator,

C = the angle at the center of the Moon's disk made by a lunar meridian with the circle of declination, *counted from north to east*,

$\lambda, \beta, \alpha, \delta$ = *the geocentric longitude, latitude,* right ascension, and declination of the Moon,

i=the inclination of the Moon's mean equator to the Earth's true equator,
Δ=the distance on the Moon's mean equator from its ascending node on the Ea true equator to its ascending node on the ecliptic,
Ω'=the distance along the Earth's true equator from the true equinox to the ascen node of the Moon's mean equator,
☾=the Moon's mean longitude, referred to the mean equinox,
g'=the Earth's mean anomaly,
g=the Moon's mean anomaly,
ω=the angular distance of the perigee of the Moon's orbit from its ascending nod the ecliptic,
b, l=the optical librations in latitude and longitude, respectively,
δb, δl=the physical librations in latitude and longitude, respectively,
$b+\delta b$=the Moon's geocentric libration in latitude=the Earth's selenographic latitude,
$l+\delta l$=the Moon's geocentric libration in longitude=the Earth's selenographic longitud
δC=the physical libration of C,

$$\mu=-0'.617 \sin 2(\Omega-\lambda),$$
$$A=\sin I \cos(\Omega-\lambda),$$
$$\tan B=\tan I \sin(\Omega-\lambda),$$
$$\lambda'=\lambda+\mu+Ab,$$
$$b=B-\beta,$$
$$l=\lambda'-☾,$$
$$\sin C'=\sin i\,\frac{\cos(\lambda'+\Delta-\Omega)}{\cos\delta}=-\sin i\,\frac{\cos(\alpha-\Omega')}{\cos b},$$
$$\delta b=+108'' \sin(\omega+l)+37'' \sin(\omega-l)-11'' \sin(g+\omega-l),$$
$$\delta l=+12'' \sin g-59'' \sin g'-18'' \sin 2\omega,$$
$$-[108'' \cos(\omega+l)-37'' \cos(\omega-l)+11'' \cos(g+\omega-l)] \tan b,$$
$$\delta C=-[108'' \cos(\omega+l)-37'' \cos(\omega-l)+11'' \cos(g+\omega-l)] \sec b,$$
$$C=C'+\delta C.$$

The Sun's selenographic latitude and longitude have been computed fr formulæ the same as those given above except that the heliocentric coordina of the Moon have been substituted for the geocentric coordinates.

The following elements have been used in computing the ephemerides physical observations of the planets Mars and Jupiter:

Position of north pole of Mars		$\alpha=21^h\ 10^m\ 0^s + 1^s.565(t-1905)$ $\delta=54°\ 30'\ 0''+12''.60(t-1905)$
Position of north pole of Jupiter		$\alpha=17^h\ 52^m\ 0^s.84+\ 0^s.247(t-1910)$ $\delta=64°\ 33'\ 34''.6-\ 0''.60(t-1910)$
Rotation period of Mars		$24^h\ 37^m\ 22^s.65$
Rotation period of Jupiter	System I.	$9^h\ 50^m\ 30^s.004$
	System II.	$9^h\ 55^m\ 40^s.632$
Longitude of Central Meridian of Mars, May 15, 1897, Greenwich Mean Noon		52°.01
Longitude of Central Meridian of Jupiter (System I.), July 14, 1897, Greenwich Mean Noon		47°.31
Longitude of Central Meridian of Jupiter (System II.), July 14, 1897, Greenwich Mean Noon		96°.58

The position of the north pole of Mars is as given by LOWELL and CR MELIN (see *Monthly Notices R. A. S.*, 1905, Vol. 66, page 56), while that of north pole of Jupiter has been deduced from the position given by DAMOISE for 1750 (see *Tables Écliptiques des Satellites de Jupiter*, page (1)). The ro tion periods of Mars and of Jupiter and the longitudes of the central meridi are according to MARTH (see *Monthly Notices R. A. S.*, 1896, Vol. 56, pa 395–403 and 517–524). The longitude of the Great Red Spot and the time its transit across the Central Meridian given in the volumes for 1913 and 1

ve been replaced by those of System II. of MARTH. This change has been ade in view of the following facts: The Paris Conference of October, 1911, signed to the office of the American Ephemeris and Nautical Almanac the eparation of the ephemerides for the physical observations of the planets; a neral desire exists that the use of System II. of MARTH should not be disntinued; and the position of the Great Red Spot during the opposition of 912 was about 70° from the place predicted from the elements adopted in the merican *Ephemeris and Nautical Almanac* for 1913.

The adopted semidiameters of the planets, with the authority for each, re given on page xix. Their stellar magnitudes have been computed from rmulæ given by G. MUELLER in *Publicationen des Astrophysikalischen Observariums zu Potsdam*, 1893, Vol. 8, page 366.

In the list of observatories the authority for the various positions is given each case. The latitudes given are in most cases astronomical. In some stances they have been determined by geodetic triangulation from other oints. The reductions from geographic to geocentric latitude, $\varphi' - \varphi$, and the istance from the center of the earth, ρ, are computed from the formulæ on age xviii, using the flattening $\frac{1}{297}$ obtained by JOHN F. HAYFORD in *Supplementary Investigation in 1909 of the Figure of the Earth and Isostasy*, U. S. Coast nd Geodetic Survey, 1910, and adopted by the *Paris Conference*, October, 1911.

ANNIVERSARIES AND FESTIVALS, 1917.

New Year's Day	Monday,	Jan.
Epiphany	Saturday,	Jan.
Septuagesima Sunday	Sunday,	Feb
Lincoln's Birthday	Monday,	Feb
Quinquagesima (Shrove Sunday)	Sunday,	Feb
Ash Wednesday	Wednesday,	Feb
Washington's Birthday	Thursday,	Feb
Palm Sunday	Sunday,	Apr
Good Friday	Friday,	Apr
First Day of Passover	Saturday,	Apr
Easter Sunday	Sunday,	Apr
Rogation Sunday	Sunday,	May
Ascension Day (Holy Thursday)	Thursday,	May
Hebrew Pentecost (Shebuoth)	Sunday,	May
Pentecost (Whit Sunday)	Sunday,	May
Memorial Day	Wednesday,	May
Trinity Sunday	Sunday,	Jun
Corpus Christi	Thursday,	Jun
Independence Day	Wednesday,	July
Labor Day (except in certain States)	Monday,	Sep
Hebrew New Year (Rosh Hashanah)	Monday,	Sep
Day of Atonement (Yom Kippur)	Wednesday,	Sep
First Day of Tabernacle (Sucoth)	Monday,	Oct.
Election Day (in certain States)	Tuesday,	Nov
Thanksgiving Day	Thursday,	Nov
First Sunday in Advent	Sunday,	Dec
Christmas Day	Tuesday,	Dec

CHRONOLOGICAL ERAS AND CYCLES.

CHRONOLOGICAL ERAS.

E YEAR 1917, WHICH COMPRISES THE LATTER PART OF THE 141ST AND THE BEGINNING OF THE 142D-YEAR OF THE INDEPENDENCE OF THE UNITED STATES OF AMERICA, CORRESPONDS TO—

The year 6630 of the Julian period;
" 7425–7426 of the Byzantine era, the year 7426 commencing on September 1;
" 5677–5678 of the Jewish era, the year 5678 commencing on September 17, or, more exactly, at sunset on September 16;
" 2670 since the foundation of Rome, according to VARRO;
" 2664 since the beginning of the era of NABONASSAR, which has been assigned to Wednesday, the 26th of February of the 3967th year of the Julian Period; corresponding in the notation of chronologists, to the 747th, and, in the notation of astronomers, to the 746th year before the birth of CHRIST;
" 2693 of the Olympiads, or the first year of the 674th Olympiad, commencing in July, 1917, if we fix the era of the Olympiads at 775½ years before CHRIST, or near the beginning of July of the year 3938 of the Julian period;
" 2229 of the Grecian era, or the era of the SELEUCIDÆ, which began near the vernal equinox of the year, −311 = B. C. 312, = 4402 of the Julian period;
" 1633 of the era of DIOCLETIAN;
" 2577 of the Japanese era and to the 6th year of the period entitled Taisho.

The year 1336 of the Mohammedan era, or the era of the Hegira, begins n the 17th day of October, 1917.

The first day of January of the year 1917 is the 2,421,230th day since the ommencement of the Julian Period.

CHRONOLOGICAL CYCLES.

ominical Letter	G	Solar Cycle	22
pact	6	Roman Indiction	15
unar Cycle or Golden Number	18	Julian Period	6630

ASTRONOMICAL CONSTANTS.

Solar Parallax	8.80″	Paris Confere
Constant of Nutation	9.21	Paris Confere
Constant of Aberration	20.47	Paris Confere
General Precession	50″.2564+0″.000 222(t−1900)	Newco
Obliquity of the Ecliptic	23° 27′ 8″.26−0″.4684(t−1900)	Newco
Equatorial Horizontal Parallax of the Moon	57′ 2″.63*	(Newco

Mean distance Earth to Moon 384 411 kilometers=238 862 miles, or 60.2678 radii.
Mean distance Earth to Sun 149 504 201 kilometers=92 897 416 statute miles.
Velocity of light 299 860 kilometers=186 324 statute miles per second (Newcomb and Michels
Light travels unit distance in 498^s.580.
Gaussian Gravitation Constant, †k=0.017 202 099=3 548″.187 61.

Acceleration in one second due to gravity, $g=9\overset{m}{.}8060-0\overset{m}{.}0260\cos 2\varphi-\frac{2h}{R}g.$‡ } Helmert.
Length of seconds pendulum, $l=0\overset{m}{.}993\,549-0\overset{m}{.}002\,631\cos 2\varphi-\frac{2h}{R}l.$‡ } Helmert.

Length of the year:

Tropical (ordinary)	365^d.242 198 79−0^d.000 000 0614 (t−1900)	Newco
Sidereal	365.256 360 42+0.000 000 0011 (t−1900)	Newco
Anomalistic	365.259 641 34+0.000 000 0304 (t−1900)	Newco
Eclipse	346.620 000 +0.000 000 36 (t−1900)	

Length of the month:

	d	d	h	m	s	
Synodical (ordinary)	29.530 588	=29	12	44	2.8	Han
Tropical	27.321 582	=27	7	43	4.7	Han
Sidereal	27.321 661	=27	7	43	11.5	Han
Anomalistic	27.554 550	=27	13	18	33.1	Han
Nodical	27.212 219	=27	5	5	35.7	Han

Length of the day:

	h	m	s	
Sidereal	23	56	4.091	of mean solar ti
Mean Solar	24	3	56.555	of sidereal time.

Dimensions of the Earth (Hayford's Spheroid of 1909):

Equatorial Radius, a=6378.388 kilometers or 3963.34 statute miles.
Polar Radius, b=6356.909 " or 3949.99 " "

Flattening, $\frac{a-b}{a}=\frac{1}{297.0}$

Logarithm of the eccentricity $\frac{\sqrt{a^2-b^2}}{a}=\log e=8.913\,804$

Logarithm radius=$\log\rho=9.999\,2695+0.000\,7324\cos 2\varphi-0.000\,0019\cos 4\varphi$.
Reduction from geographic latitude φ to geocentric latitude φ',

$$\varphi'-\varphi=-11'\,35''.66\sin 2\varphi+1''.17\sin 4\varphi.$$

1 meter=3.280 8333 feet. 1 foot=0.304 8006 meters.
1 statute mile=0.868 362 nautical or geographical miles.
1 nautical mile=1.151 594 statute miles.

* Used in the computation of eclipses. The parallax used in the computation of the ephemeris of the Moon conta in this volume is 57′ 2″.23 (Hansen).
† k^2 is the acceleration due to the Sun's attraction at the mean distance of the Earth from the Sun, which is als astronomical unit of distance, the unit of time being one mean solar day.
‡ φ=latitude, h=elevation above sea level in meters, and log R=6.80416.

NOTE.—The above values of log ρ and $\varphi'-\varphi$ were computed with the eccentricity that results from assuming the flattening of the earth is exactly $\frac{1}{297}$.

ASTRONOMICAL CONSTANTS.

SEMIDIAMETERS OF THE SUN, MOON, AND PLANETS.

Name.	At Unit Distance. ′ ″	At Mean Least Distance. ″	In Kilometers.	In Statute Miles.	Authority.
Sun	15 59.63	. .	695 553.46	432 196.01	Auwers.
Moon	15 32.58*	. .	1 738.02	1 079.96	Newcomb.
Mercury	3.34	5.45	2 420.89	1 504.27	Le Verrier.
Venus	8.55	30.90	6 197.18	3 850.74	Peirce.
Mars	5.05	9.64	3 660.32	2 274.42	Peirce.
Jupiter (Equatorial)	1 40.20	23.84	72 626.64	45 128.01	Am. Eph.
Jupiter (Polar)	1 34.12	22.40	68 219.76	42 389.71	Peirce.
Saturn (Equatorial)	1 24.88	9.94	61 522.45	38 228.20	Barnard.
Saturn (Polar)	1 17.47	9.07	56 151.56	34 890.89	Barnard.
Uranus	33.52	1.84	24 295.86	15 096.72	Am. Eph.
Neptune	38.66	1.33	28 021.42	17 411.67	Am. Eph.

ELEMENTS OF THE PLANETARY ORBITS FOR THE EPOCH 1917—January 0^d G. M. T.

Name.	Mean Distance.	Sidereal Period in Tropical Years.	Sidereal Mean Daily Motion. ″	Synodic Period in Tropical Years.	Eccentricity.
☿ Mercury	0.387 099	0.240 85	14 732.420	0.317 26	0.205 6177
♀ Venus	0.723 331	0.615 21	5 767.670	1.598 72	0.006 8126
⊕ Earth	1.000 000	1.000 04	3 548.193	. . .	0.016 7430
♂ Mars	1.523 688	1.880 89	1 886.519	2.135 39	0.093 3244
♃ Jupiter	5.202 803	11.862 23	299.128	1.092 11	0.048 3653
♄ Saturn	9.538 843	29.457 72	120.455	1.035 18	0.055 8310
♅ Uranus	19.190 978	84.015 29	42.23	1.012 09	0.047 0922
♆ Neptune	30.070 672	164.788 29	21.53	1.006 14	0.008 5441

Name.	Inclination to the Ecliptic. ° ′ ″	Mean Longitude of the Node. ° ′ ″	Mean Longitude of the Perihelion. ° ′ ″	Mean Longitude at the Epoch. ° ′ ″	Logarithm of Mass in Unit of Sun's Mass.
☿ Mercury . . .	7 0 11.5	47 20 50.7	76 9 50.9	27 44 52.89	3.221 8487−10
♀ Venus	3 23 37.7	75 55 57.5	130 24 11.4	210 37 57.16	4.389 3398−10
⊕ Earth	. . . . .	. . . . .	101 30 47.1	99 34 51.57	4.482 2896−10
♂ Mars . . .	1 51 0.9	48 55 1.4	334 31 53.0	307 42 19.72	3.509 5499−10
♃ Jupiter . . .	1 18 28.1	99 36 35.2	12 59 7.6	34 12 1.58	6.979 9082−10
♄ Saturn . . .	2 29 29.8	112 55 54.7	91 25 18.3	114 33 12.34	6.455 7335−10
♅ Uranus . . .	0 46 22.0	73 34 32.6	169 19 14.1	316 26 34.40	5.640 7528−10
♆ Neptune . .	1 46 39.4	130 51 56.8	43 54 15.2	122 24 2.19	5.705 5338−10

The elements of the four inner planets are derived from those given by NEWCOMB in Vol. VI of the *Astronomical Papers of the American Ephemeris*, and are the same as those used in computing the ephemerides of these planets. Those of Jupiter, Saturn, Uranus, and Neptune are taken from Vol. VII of the *Astronomical Papers* for the epoch of the tables. They are reduced to 1917 by applying LE VERRIER's variations, and can not be regarded as being strictly identical with the elements used in computing the ephemerides of those planets in this volume.

* At mean distance. See *Ast. Papers Am. Eph.*, Vol. IX, p. 39. For the values of the semidiameter used in this volume see page xiii.

SYMBOLS AND ABBREVIATIONS.

SIGNS OF THE PLANETS, ETC.

☉	The Sun.	♂	Mars.
☾	The Moon.	♃	Jupiter.
☿	Mercury.	♄	Saturn.
♀	Venus.	♅	Uranus.
⊕	The Earth.	♆	Neptune.

SIGNS OF THE ZODIAC.

Spring Signs.	1. ♈	Aries.		Autumn Signs.	7. ♎	Libra.
	2. ♉	Taurus.			8. ♏	Scorpius
	3. ♊	Gemini.			9. ♐	Sagittar
Summer Signs.	4. ♋	Cancer.		Winter Signs.	10. ♑	Capricor
	5. ♌	Leo.			11. ♒	Aquariu
	6. ♍	Virgo.			12. ♓	Pisces.

ASPECTS.

☌ Conjunction, or having the same Longitude or Right Ascension,
□ Quadrature, or differing $\pm 90°$ in Longitude or Right Ascension.
☍ Opposition, or differing 180° in Longitude or Right Ascension.

ABBREVIATIONS.

☊	Ascending Node.	°	Degrees.
☋	Descending Node.	′	Minutes of Arc.
N.	North.	″	Seconds of Arc.
S.	South.	^{h}	Hours.
E.	East.	^{m}	Minutes of Time.
W.	West.	^{s}	Seconds of Time.

PART I.

ASTRONOMICAL EPHEMERIS FOR THE MERIDIAN OF GREENWICH.

FOR GREENWICH MEAN NOON.

Date.		Day of the Week.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Semi-diameter.	Hor. Par.	Equation of Time. App.—Mean.	Var. per Hour.	Sidere… or Rig… sion … S…
			h m s	s	° ′ ″	″	′ ″	″	m s	s	h …
Jan.	1	Mo	18 45 50.11	11.041	−23 1 56.7	+12.09	16 17.87	8.95	− 3 34.47	−1.184	18 4…
	2	Tu	18 50 14.92	11.026	22 56 52.8	13.23	16 17.88	8.95	4 2.72	1.170	18 4…
	3	We	18 54 39.37	11.011	22 51 21.6	14.37	16 17.88	8.95	4 30.61	1.154	18 5…
	4	Th	18 59 3.42	10.994	22 45 23.2	15.50	16 17.88	8.95	4 58.11	1.137	18 5…
	5	Fr	19 3 27.06	10.976	22 38 57.7	16.62	16 17.87	8.95	5 25.19	1.119	18 5…
	6	Sa	19 7 50.25	10.957	−22 32 5.4	+17.74	16 17.85	8.95	− 5 51.83	−1.100	19 …
	7	Su	19 12 12.98	10.937	22 24 46.4	18.84	16 17.83	8.95	6 17.99	1.080	19 …
	8	Mo	19 16 35.22	10.916	22 17 1.0	19.94	16 17.80	8.95	6 43.67	1.059	19 …
	9	Tu	19 20 56.94	10.894	22 8 49.3	21.03	16 17.77	8.95	7 8.83	1.037	19 1…
	10	We	19 25 18.12	10.871	22 0 11.6	22.11	16 17.73	8.95	7 33.46	1.015	19 1…
	11	Th	19 29 38.75	10.848	−21 51 8.2	+23.18	16 17.68	8.95	− 7 57.53	−0.991	19 2…
	12	Fr	19 33 58.80	10.823	21 41 39.2	24.24	16 17.63	8.95	8 21.02	0.967	19 2…
	13	Sa	19 38 18.25	10.798	21 31 44.9	25.28	16 17.57	8.95	8 43.92	0.941	19 2…
	14	Su	19 42 37.09	10.772	21 21 25.7	26.32	16 17.51	8.95	9 6.20	0.915	19 3…
	15	Mo	19 46 55.30	10.745	21 10 41.7	27.34	16 17.44	8.95	9 27.85	0.888	19 3…
	16	Tu	19 51 12.85	10.717	−20 59 33.3	+28.35	16 17.36	8.95	− 9 48.84	−0.861	19 4…
	17	We	19 55 29.73	10.689	20 48 0.8	29.35	16 17.28	8.94	10 9.17	0.833	19 4…
	18	Th	19 59 45.93	10.660	20 36 4.4	30.34	16 17.20	8.94	10 28.81	0.804	19 4…
	19	Fr	20 4 1.42	10.631	20 23 44.6	31.31	16 17.11	8.94	10 47.75	0.774	19 5…
	20	Sa	20 8 16.20	10.601	20 11 1.7	32.27	16 17.02	8.94	11 5.97	0.744	19 5…
	21	Su	20 12 30.25	10.570	−19 57 55.9	+33.21	16 16.92	8.94	−11 23.45	−0.713	20 …
	22	Mo	20 16 43.54	10.538	19 44 27.8	34.13	16 16.82	8.94	11 40.19	0.681	20 …
	23	Tu	20 20 56.06	10.506	19 30 37.7	35.04	16 16.72	8.94	11 56.15	0.649	20 …
	24	We	20 25 7.80	10.473	19 16 25.9	35.94	16 16.61	8.94	12 11.33	0.616	20 1…
	25	Th	20 29 18.74	10.439	19 1 52.9	36.81	16 16.51	8.94	12 25.72	0.583	20 1…
	26	Fr	20 33 28.87	10.405	−18 46 59.0	+37.67	16 16.39	8.94	−12 39.29	−0.549	20 2…
	27	Sa	20 37 38.18	10.371	18 31 44.7	38.51	16 16.28	8.94	12 52.05	0.514	20 2…
	28	Su	20 41 46.66	10.336	18 16 10.4	39.34	16 16.16	8.93	13 3.97	0.479	20 2…
	29	Mo	20 45 54.31	10.302	18 0 16.4	40.15	16 16.03	8.93	13 15.06	0.445	20 3…
	30	Tu	20 50 1.13	10.267	17 44 3.2	40.95	16 15.91	8.93	13 25.32	0.410	20 3…
	31	We	20 54 7.10	10.231	−17 27 31.1	+41.72	16 15.77	8.93	−13 34.74	−0.375	20 4…
Feb.	1	Th	20 58 12.23	10.196	17 10 40.7	42.48	16 15.64	8.93	13 43.32	0.340	20 4…
	2	Fr	21 2 16.53	10.162	16 53 32.2	43.23	16 15.49	8.93	13 51.06	0.306	20 4…
	3	Sa	21 6 20.00	10.127	16 36 6.0	43.95	16 15.35	8.93	13 57.97	0.271	20 5…
	4	Su	21 10 22.63	10.092	16 18 22.6	44.66	16 15.19	8.93	14 4.05	0.236	20 5…
	5	Mo	21 14 24.44	10.058	−16 0 22.3	+45.36	16 15.03	8.92	−14 9.31	−0.202	21 …
	6	Tu	21 18 25.44	10.025	15 42 5.6	46.03	16 14.87	8.92	14 13.75	0.168	21 …
	7	We	21 22 25.63	9.991	15 23 32.8	46.70	16 14.70	8.92	14 17.38	0.135	21 …
	8	Th	21 26 25.02	9.958	15 4 44.3	47.34	16 14.53	8.92	14 20.21	0.101	21 1…
	9	Fr	21 30 23.61	9.925	14 45 40.5	47.97	16 14.35	8.92	14 22.25	0.069	21 1…
	10	Sa	21 34 21.43	9.893	−14 26 21.8	+48.58	16 14.16	8.92	−14 23.51	−0.036	21 1…
	11	Su	21 38 18.48	9.861	14 6 48.7	49.18	16 13.98	8.91	14 24.00	−0.004	21 2…
	12	Mo	21 42 14.76	9.829	13 47 1.5	49.76	16 13.79	8.91	14 23.73	+0.027	21 2…
	13	Tu	21 46 10.30	9.799	13 27 0.5	50.32	16 13.59	8.91	14 22.72	0.058	21 3…
	14	We	21 50 5.11	9.769	13 6 46.3	50.86	16 13.39	8.91	14 20.97	0.088	21 3…
	15	Th	21 53 59.20	9.739	−12 46 19.2	+51.39	16 13.18	8.91	−14 18.50	+0.118	21 3…
	16	Fr	21 57 52.57	9.709	−12 25 39.6	+51.90	16 12.97	8.90	−14 15.32	+0.147	21 4…

FOR GREENWICH MEAN NOON.

FOR GREENWICH MEAN NOON.

Date.	Day of the Week.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Semi-diameter.	Hor. Par.	Equation of Time. App.—Mean.	Var. per Hour.	Sider… or Rig… sion …
		h m s	s	° ′ ″	″	′ ″	″	m s	s	h
Feb. 16	Fr	21 57 52.57	9.709	−12 25 39.6	+51.90	16 12.97	8.90	−14 15.32	+0.147	21 4
17	Sa	22 1 45.24	9.680	12 4 48.0	52.40	16 12.76	8.90	14 11.44	0.176	21 4
18	Su	22 5 37.23	9.652	11 43 44.7	52.87	16 12.55	8.90	14 6.87	0.204	21 5
19	Mo	22 9 28.54	9.624	11 22 30.3	53.33	16 12.34	8.90	14 1.63	0.232	21 5
20	Tu	22 13 19.19	9.596	11 1 5.1	53.77	16 12.12	8.90	13 55.72	0.260	21 5
21	We	22 17 9.17	9.569	−10 39 29.7	+54.19	16 11.90	8.90	−13 49.15	+0.287	22
22	Th	22 20 58.51	9.543	10 17 44.3	54.59	16 11.68	8.89	13 41.94	0.314	22
23	Fr	22 24 47.22	9.516	9 55 49.5	54.97	16 11.46	8.89	13 34.09	0.340	22 1
24	Sa	22 28 35.29	9.490	9 33 45.8	55.33	16 11.24	8.89	13 25.61	0.366	22 1
25	Su	22 32 22.76	9.465	9 11 33.6	55.68	16 11.01	8.89	13 16.53	0.391	22 1
26	Mo	22 36 9.63	9.440	− 8 49 13.2	+56.01	16 10.78	8.88	−13 6.84	+0.416	22 2
27	Tu	22 39 55.91	9.416	8 26 45.1	56.33	16 10.55	8.88	12 56.57	0.440	22 2
28	We	22 43 41.63	9.393	8 4 9.6	56.62	16 10.32	8.88	12 45.73	0.463	22 3
Mar. 1	Th	22 47 26.80	9.371	7 41 27.3	56.90	16 10.09	8.88	12 34.34	0.485	22 3
2	Fr	22 51 11.43	9.349	7 18 38.4	57.17	16 9.85	8.88	12 22.43	0.507	22 3
3	Sa	22 54 55.56	9.328	− 6 55 43.4	+57.41	16 9.61	8.87	−12 10.00	+0.528	22 4
4	Su	22 58 39.19	9.308	6 32 42.7	57.64	16 9.37	8.87	11 57.08	0.548	22 4
5	Mo	23 2 22.36	9.289	6 9 36.6	57.86	16 9.13	8.87	11 43.69	0.567	22 5
6	Tu	23 6 5.07	9.271	5 46 25.4	58.06	16 8.88	8.87	11 29.86	0.586	22 5
7	We	23 9 47.36	9.254	5 23 9.6	58.25	16 8.63	8.87	11 15.59	0.603	22 5
8	Th	23 13 29.25	9.237	− 4 59 49.5	+58.42	16 8.38	8.86	−11 0.92	+0.619	23
9	Fr	23 17 10.75	9.221	4 36 25.5	58.58	16 8.12	8.86	10 45.87	0.635	23
10	Sa	23 20 51.89	9.207	4 12 58.0	58.72	16 7.86	8.86	10 30.45	0.650	23 1
11	Su	23 24 32.69	9.193	3 49 27.2	58.85	16 7.59	8.86	10 14.70	0.663	23 1
12	Mo	23 28 13.18	9.181	3 25 53.5	58.96	16 7.33	8.85	9 58.64	0.675	23 1
13	Tu	23 31 53.38	9.169	− 3 2 17.4	+59.05	16 7.06	8.85	− 9 42.29	+0.687	23 2
14	We	23 35 33.31	9.159	2 38 39.1	59.13	16 6.79	8.85	9 25.67	0.698	23 2
15	Th	23 39 13.00	9.149	2 14 59.1	59.20	16 6.52	8.85	9 8.80	0.708	23 3
16	Fr	23 42 52.46	9.140	1 51 17.7	59.25	16 6.24	8.84	8 51.71	0.716	23 3
17	Sa	23 46 31.73	9.132	1 27 35.2	59.29	16 5.97	8.84	8 34.42	0.724	23 3
18	Su	23 50 10.81	9.125	− 1 3 52.0	+59.31	16 5.69	8.84	− 8 16.95	+0.731	23 4
19	Mo	23 53 49.73	9.119	0 40 8.6	59.31	16 5.42	8.84	7 59.32	0.738	23 4
20	Tu	23 57 28.51	9.113	− 0 16 25.2	59.30	16 5.14	8.83	7 41.55	0.743	23 4
21	We	0 1 7.17	9.108	+ 0 7 17.6	59.27	16 4.86	8.83	7 23.65	0.748	23 5
22	Th	0 4 45.71	9.104	0 30 59.5	59.22	16 4.59	8.83	7 5.64	0.752	23 5
23	Fr	0 8 24.16	9.101	+ 0 54 40.2	+59.16	16 4.31	8.83	− 6 47.54	+0.756	0
24	Sa	0 12 2.54	9.098	1 18 19.2	59.09	16 4.04	8.82	6 29.36	0.759	0
25	Su	0 15 40.85	9.095	1 41 56.2	58.99	16 3.77	8.82	6 11.12	0.761	0
26	Mo	0 19 19.12	9.094	2 5 30.6	58.88	16 3.49	8.82	5 52.84	0.762	0 1
27	Tu	0 22 57.36	9.093	2 29 2.3	58.76	16 3.22	8.82	5 34.53	0.763	0 1
28	We	0 26 35.59	9.093	+ 2 52 30.8	+58.63	16 2.95	8.81	− 5 16.20	+0.763	0 2
29	Th	0 30 13.83	9.094	3 15 55.8	58.46	16 2.68	8.81	4 57.89	0.763	0 2
30	Fr	0 33 52.10	9.095	3 39 16.9	58.29	16 2.41	8.81	4 39.60	0.761	0 2
31	Sa	0 37 30.41	9.098	4 2 33.8	58.11	16 2.14	8.81	4 21.36	0.759	0 3
Apr. 1	Su	0 41 8.79	9.101	4 25 46.1	57.91	16 1.87	8.80	4 3.19	0.755	0 3
2	Mo	0 44 47.26	9.105	+ 4 48 53.5	+57.70	16 1.60	8.80	− 3 45.11	+0.751	0 4
3	Tu	0 48 25.83	9.110	+ 5 11 55.7	+57.48	16 1.32	8.80	− 3 27.13	+0.747	0 4

FOR GREENWICH MEAN NOON.

Date.	Day of the Week.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Semi-diameter.	Hor. Par.	Equation of Time. App.—Mean.	Var. per Hour.	Sider… or Ri… sion
		h m s	s	° ′ ″	″	′ ″	″	m s	s	h m
Apr. 1	Su	0 41 8.79	9.101	+ 4 25 46.1	+57.91	16 1.87	8.80	−4 3.19	+0.755	0 3
2	Mo	0 44 47.26	9.105	4 48 53.5	57.70	16 1.60	8.80	3 45.11	0.751	0 4
3	Tu	0 48 25.83	9.110	5 11 55.7	57.48	16 1.32	8.80	3 27.13	0.747	0 4
4	We	0 52 4.54	9.116	5 34 52.4	57.24	16 1.05	8.80	3 9.28	0.741	0 4
5	Th	0 55 43.39	9.122	5 57 43.1	56.99	16 0.78	8.79	2 51.58	0.734	0 5
6	Fr	0 59 22.41	9.130	+ 6 20 27.7	+56.72	16 0.50	8.79	−2 34.05	+0.727	0 5
7	Sa	1 3 1.63	9.138	6 43 5.7	56.44	16 0.23	8.79	2 16.71	0.718	1
8	Su	1 6 41.05	9.147	7 5 36.9	56.15	15 59.96	8.79	1 59.58	0.709	1
9	Mo	1 10 20.71	9.158	7 28 0.9	55.85	15 59.68	8.78	1 42.69	0.698	1
10	Tu	1 14 0.63	9.169	7 50 17.4	55.53	15 59.40	8.78	1 26.06	0.688	1 1
11	We	1 17 40.83	9.181	+ 8 12 26.1	+55.20	15 59.13	8.78	−1 9.69	+0.676	1 1
12	Th	1 21 21.32	9.193	8 34 26.7	54.85	15 58.85	8.78	0 53.63	0.663	1 2
13	Fr	1 25 2.12	9.207	8 56 18.8	54.49	15 58.57	8.77	0 37.88	0.649	1 2
14	Sa	1 28 43.26	9.222	9 18 2.1	54.12	15 58.30	8.77	0 22.47	0.635	1 2
15	Su	1 32 24.76	9.237	9 39 36.3	53.73	15 58.02	8.77	−0 7.41	0.620	1 3
16	Mo	1 36 6.62	9.252	+10 1 1.0	+53.33	15 57.75	8.77	+0 7.28	+0.604	1 3
17	Tu	1 39 48.87	9.268	10 22 15.9	52.91	15 57.48	8.76	0 21.59	0.588	1 4
18	We	1 43 31.51	9.285	10 43 20.6	52.48	15 57.21	8.76	0 35.50	0.571	1 4
19	Th	1 47 14.55	9.302	11 4 14.7	52.03	15 56.95	8.76	0 49.01	0.554	1 4
20	Fr	1 50 58.02	9.320	11 24 57.9	51.57	15 56.68	8.76	1 2.10	0.537	1 5
21	Sa	1 54 41.91	9.338	+11 45 29.9	+51.09	15 56.43	8.75	+1 14.76	+0.519	1 5
22	Su	1 58 26.23	9.356	12 5 50.3	50.60	15 56.17	8.75	1 26.99	0.500	1 5
23	Mo	2 2 11.00	9.375	12 25 58.6	50.09	15 55.91	8.75	1 38.78	0.483	2
24	Tu	2 5 56.22	9.394	12 45 54.7	49.57	15 55.66	8.75	1 50.12	0.463	2
25	We	2 9 41.90	9.413	13 5 38.1	49.04	15 55.41	8.74	2 0.99	0.443	2 1
26	Th	2 13 28.04	9.432	+13 25 8.5	+48.49	15 55.17	8.74	+2 11.40	+0.424	2 1
27	Fr	2 17 14.66	9.453	13 44 25.6	47.93	15 54.93	8.74	2 21.33	0.404	2 1
28	Sa	2 21 1.77	9.473	14 3 29.1	47.36	15 54.69	8.74	2 30.78	0.384	2 2
29	Su	2 24 49.37	9.494	14 22 18.7	46.77	15 54.45	8.74	2 39.74	0.363	2 2
30	Mo	2 28 37.47	9.515	14 40 53.9	46.17	15 54.21	8.73	2 48.19	0.342	2 3
May 1	Tu	2 32 26.09	9.536	+14 59 14.6	+45.56	15 53.98	8.73	+2 56.13	+0.320	2 3
2	We	2 36 15.22	9.558	15 17 20.5	44.93	15 53.75	8.73	3 3.55	0.298	2 3
3	Th	2 40 4.88	9.580	15 35 11.2	44.29	15 53.51	8.73	3 10.45	0.276	2 4
4	Fr	2 43 55.08	9.603	15 52 46.3	43.64	15 53.29	8.73	3 16.81	0.254	2 4
5	Sa	2 47 45.82	9.626	16 10 5.8	42.97	15 53.06	8.72	3 22.62	0.231	2 5
6	Su	2 51 37.11	9.649	+16 27 9.1	+42.30	15 52.83	8.72	+3 27.89	+0.208	2 5
7	Mo	2 55 28.96	9.672	16 43 56.1	41.61	15 52.61	8.72	3 32.59	0.184	2 5
8	Tu	2 59 21.38	9.696	17 0 26.4	40.91	15 52.39	8.72	3 36.73	0.160	3
9	We	3 3 14.38	9.720	17 16 39.8	40.20	15 52.16	8.72	3 40.29	0.136	3
10	Th	3 7 7.95	9.744	17 32 36.0	39.48	15 51.94	8.71	3 43.26	0.112	3 1
11	Fr	3 11 2.12	9.769	+17 48 14.7	+38.74	15 51.73	8.71	+3 45.65	+0.087	3 1
12	Sa	3 14 56.88	9.794	18 3 35.6	37.99	15 51.51	8.71	3 47.45	0.063	3 1
13	Su	3 18 52.23	9.819	18 18 38.3	37.23	15 51.30	8.71	3 48.65	0.038	3 2
14	Mo	3 22 48.18	9.844	18 33 22.7	36.46	15 51.09	8.71	3 49.26	+0.013	3 2
15	Tu	3 26 44.72	9.868	18 47 48.4	35.68	15 50.88	8.70	3 49.27	−0.012	3 3
16	We	3 30 41.85	9.893	+19 1 55.2	+34.88	15 50.68	8.70	+3 48.70	−0.036	3 3
17	Th	3 34 39.57	9.917	+19 15 42.6	+34.07	15 50.48	8.70	+3 47.54	−0.060	3 3

FOR GREENWICH MEAN NOON.

Date.	Day of the Year.	True Longitude.	Var. per Hour.	Latitude.	Logarithm of the Radius Vector of the Earth.	Var. per Hour.	Prec. in Long.	Nut. in Long.	Aberration.	True Obliquity.	Mean Time of Sidereal Noon.
		° ′ ″	″	″			″	″	″	23° 27′ ″	h m s
pr. 1	91	11 11 45.7	147.91	−0.06	9.999 8342	+51.0	12.46	+16.16	20.47	3.24	23 19 4.57
2	92	12 10 54.5	147.82	0.17	9.999 9568	51.1	12.60	16.13	20.47	3.23	23 15 8.66
3	93	13 10 1.0	147.73	0.27	0.000 0797	51.2	12.74	16.09	20.46	3.21	23 11 12.75
4	94	14 9 5.3	147.63	0.35	0.000 2028	51.3	12.88	16.06	20.45	3.19	23 7 16.85
5	95	15 8 7.4	147.54	0.41	0.000 3262	51.5	13.01	16.02	20.45	3.17	23 3 20.94
6	96	16 7 7.4	147.46	−0.45	0.000 4500	+51.7	13.15	+15.99	20.44	3.15	22 59 25.03
7	97	17 6 5.3	147.37	0.46	0.000 5741	51.8	13.29	15.96	20.44	3.13	22 55 29.13
8	98	18 5 1.2	147.29	0.44	0.000 6985	51.9	13.43	15.93	20.43	3.11	22 51 33.22
9	99	19 3 55.1	147.21	0.39	0.000 8232	52.0	13.56	15.90	20.43	3.09	22 47 37.31
10	100	20 2 47.1	147.13	0.32	0.000 9482	52.1	13.70	15.87	20.42	3.07	22 43 41.40
11	101	21 1 37.3	147.05	−0.22	0.001 0734	+52.2	13.84	+15.84	20.41	3.05	22 39 45.50
12	102	22 0 25.6	146.98	−0.10	0.001 1985	52.1	13.98	15.81	20.41	3.03	22 35 49.59
13	103	22 59 12.3	146.91	+0.03	0.001 3235	52.0	14.11	15.78	20.40	3.00	22 31 53.68
14	104	23 57 57.3	146.84	0.16	0.001 4483	51.9	14.25	15.76	20.40	2.98	22 27 57.77
15	105	24 56 40.6	146.77	0.29	0.001 5727	51.7	14.39	15.73	20.39	2.96	22 24 1.86
16	106	25 55 22.3	146.70	+0.41	0.001 6963	+51.4	14.53	+15.71	20.38	2.93	22 20 5.96
17	107	26 54 2.3	146.63	0.51	0.001 8192	51.0	14.66	15.69	20.38	2.91	22 16 10.05
18	108	27 52 40.6	146.56	0.59	0.001 9412	50.6	14.80	15.67	20.37	2.89	22 12 14.14
19	109	28 51 17.2	146.49	0.63	0.002 0620	50.1	14.94	15.65	20.37	2.86	22 8 18.23
20	110	29 49 52.1	146.41	0.64	0.002 1815	49.5	15.08	15.63	20.37	2.83	22 4 22.32
21	111	30 48 25.1	146.34	+0.63	0.002 2997	+49.0	15.21	+15.61	20.36	2.81	22 0 26.42
22	112	31 46 56.2	146.26	0.59	0.002 4166	48.4	15.35	15.59	20.36	2.79	21 56 30.51
23	113	32 45 25.3	146.17	0.52	0.002 5320	47.8	15.49	15.58	20.35	2.76	21 52 34.60
24	114	33 43 52.5	146.09	0.42	0.002 6461	47.3	15.63	15.56	20.35	2.73	21 48 38.69
25	115	34 42 17.6	146.01	0.30	0.002 7590	46.7	15.76	15.55	20.34	2.71	21 44 42.78
26	116	35 40 40.7	145.92	+0.18	0.002 8705	+46.2	15.90	+15.54	20.33	2.68	21 40 46.87
27	117	36 39 1.8	145.83	+0.05	0.002 9809	45.8	16.04	15.53	20.33	2.65	21 36 50.96
28	118	37 37 20.7	145.75	−0.07	0.003 0903	45.4	16.18	15.52	20.32	2.62	21 32 55.05
29	119	38 35 37.6	145.66	0.19	0.003 1986	44.9	16.32	15.52	20.32	2.60	21 28 59.14
30	120	39 33 52.5	145.58	0.30	0.003 3059	44.5	16.45	15.51	20.31	2.57	21 25 3.24
ay 1	121	40 32 5.4	145.49	−0.38	0.003 4124	+44.2	16.59	+15.50	20.31	2.54	21 21 7.33
2	122	41 30 16.2	145.41	0.44	0.003 5180	43.8	16.73	15.50	20.30	2.51	21 17 11.42
3	123	42 28 25.2	145.33	0.48	0.003 6229	43.5	16.87	15.50	20.30	2.49	21 13 15.51
4	124	43 26 32.2	145.25	0.49	0.003 7270	43.3	17.00	15.50	20.29	2.46	21 9 19.60
5	125	44 24 37.4	145.18	0.47	0.003 8306	43.0	17.14	15.50	20.29	2.43	21 5 23.69
6	126	45 22 40.9	145.11	−0.43	0.003 9335	+42.7	17.28	+15.50	20.28	2.40	21 1 27.78
7	127	46 20 42.6	145.04	0.36	0.004 0358	42.5	17.42	15.51	20.28	2.38	20 57 31.87
8	128	47 18 42.8	144.98	0.25	0.004 1375	42.3	17.55	15.51	20.27	2.35	20 53 35.96
9	129	48 16 41.4	144.91	0.14	0.004 2386	42.0	17.69	15.52	20.27	2.32	20 49 40.05
10	130	49 14 38.6	144.86	−0.01	0.004 3390	41.7	17.83	15.53	20.26	2.29	20 45 44.14
11	131	50 12 34.5	144.80	+0.12	0.004 4385	+41.3	17.97	+15.54	20.26	2.26	20 41 48.23
12	132	51 10 29.0	144.75	0.26	0.004 5371	40.8	18.10	15.55	20.25	2.24	20 37 52.32
13	133	52 8 22.4	144.69	0.37	0.004 6345	40.3	18.24	15.56	20.25	2.21	20 33 56.41
14	134	53 6 14.5	144.65	0.48	0.004 7306	39.8	18.38	15.57	20.24	2.18	20 30 0.50
15	135	54 4 5.5	144.60	0.57	0.004 8253	39.1	18.52	15.59	20.24	2.16	20 26 4.59
16	136	55 1 55.3	144.55	+0.62	0.004 9183	+38.4	18.65	+15.60	20.23	2.13	20 22 8.68
17	137	55 59 43.9	144.50	+0.63	0.005 0096	+37.6	18.79	+15.62	20.23	2.10	20 18 12.77

FOR GREENWICH MEAN NOON.

Date.		Day of the Week.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Semi-diameter.	Hor. Par.	Equation of Time. App.—Mean.	Var. per Hour.	Sidere or Righ sion o Su
			h m s	s	° ′ ″	″	′ ″	″	m s	s	h m
July	1	Su	6 39 23.88	10.341	+23 8 28.4	− 9.73	15 45.71	8.66	−3 31.68	−0.484	6 35
	2	Mo	6 43 31.93	10.330	23 4 22.9	10.73	15 45.71	8.66	3 43.17	0.473	6 39
	3	Tu	6 47 39.69	10.317	22 59 53.2	11.74	15 45.70	8.66	3 54.37	0.461	6 43
	4	We	6 51 47.16	10.305	22 54 59.4	12.74	15 45.70	8.66	4 5.28	0.448	6 47
	5	Th	6 55 54.32	10.292	22 49 41.7	13.73	15 45.71	8.66	4 15.88	0.435	6 51
	6	Fr	7 0 1.15	10.278	+22 44 0.2	−14.72	15 45.71	8.66	−4 26.16	−0.421	6 55
	7	Sa	7 4 7.64	10.263	22 37 55.1	15.71	15 45.72	8.66	4 36.09	0.407	6 59
	8	Su	7 8 13.78	10.248	22 31 26.3	16.69	15 45.74	8.66	4 45.67	0.392	7 3
	9	Mo	7 12 19.55	10.233	22 24 34.2	17.66	15 45.75	8.66	4 54.89	0.376	7 7
	10	Tu	7 16 24.94	10.216	22 17 18.8	18.63	15 45.77	8.66	5 3.72	0.360	7 11
	11	We	7 20 29.92	10.199	+22 9 40.2	−19.59	15 45.80	8.66	−5 12.15	−0.343	7 15
	12	Th	7 24 34.49	10.182	22 1 38.7	20.54	15 45.83	8.66	5 20.16	0.325	7 19
	13	Fr	7 28 38.63	10.163	21 53 14.5	21.48	15 45.86	8.66	5 27.74	0.306	7 23
	14	Sa	7 32 42.32	10.144	21 44 27.7	22.42	15 45.90	8.66	5 34.87	0.287	7 27
	15	Su	7 36 45.54	10.124	21 35 18.6	23.34	15 45.94	8.66	5 41.53	0.268	7 31
	16	Mo	7 40 48.28	10.104	+21 25 47.3	−24.26	15 45.99	8.66	−5 47.71	−0.247	7 35
	17	Tu	7 44 50.52	10.083	21 15 54.1	25.17	15 46.04	8.66	5 53.39	0.226	7 38
	18	We	7 48 52.24	10.061	21 5 39.2	26.07	15 46.11	8.66	5 58.56	0.204	7 42
	19	Th	7 52 53.43	10.038	20 55 2.9	26.96	15 46.17	8.66	6 3.19	0.182	7 46
	20	Fr	7 56 54.07	10.015	20 44 5.4	27.83	15 46.24	8.66	6 7.28	0.159	7 50
	21	Sa	8 0 54.16	9.992	+20 32 47.0	−28.70	15 46.32	8.66	−6 10.81	−0.136	7 54
	22	Su	8 4 53.68	9.968	20 21 7.8	29.56	15 46.40	8.66	6 13.78	0.112	7 58
	23	Mo	8 8 52.62	9.944	20 9 8.3	30.40	15 46.49	8.66	6 16.16	0.087	8 2
	24	Tu	8 12 50.97	9.919	19 56 48.5	31.24	15 46.58	8.66	6 17.95	0.062	8 6
	25	We	8 16 48.73	9.894	19 44 8.9	32.06	15 46.68	8.66	6 19.15	0.037	8 10
	26	Th	8 20 45.88	9.868	+19 31 9.7	−32.87	15 46.78	8.66	−6 19.74	−0.012	8 14
	27	Fr	8 24 42.41	9.843	19 17 51.2	33.67	15 46.88	8.67	6 19.72	+0.014	8 18
	28	Sa	8 28 38.33	9.817	19 4 13.5	34.46	15 46.99	8.67	6 19.08	0.039	8 22
	29	Su	8 32 33.63	9.791	18 50 17.1	35.24	15 47.11	8.67	6 17.83	0.065	8 26
	30	Mo	8 36 28.31	9.765	18 36 2.2	36.00	15 47.22	8.67	6 15.95	0.091	8 30
	31	Tu	8 40 22.37	9.740	+18 21 29.0	−36.76	15 47.34	8.67	−6 13.45	+0.117	8 34
Aug.	1	We	8 44 15.81	9.714	18 6 37.8	37.50	15 47.47	8.67	6 10.34	0.143	8 38
	2	Th	8 48 8.64	9.689	17 51 28.9	38.24	15 47.59	8.67	6 6.61	0.168	8 42
	3	Fr	8 52 0.86	9.663	17 36 2.5	38.96	15 47.72	8.67	6 2.27	0.193	8 45
	4	Sa	8 55 52.47	9.638	17 20 19.0	39.67	15 47.85	8.68	5 57.33	0.218	8 49
	5	Su	8 59 43.49	9.614	+17 4 18.5	−40.37	15 47.99	8.68	−5 51.80	+0.243	8 53
	6	Mo	9 3 33.93	9.589	16 48 1.4	41.06	15 48.12	8.68	5 45.68	0.267	8 57
	7	Tu	9 7 23.78	9.565	16 31 27.9	41.73	15 48.26	8.68	5 38.98	0.291	9 1
	8	We	9 11 13.06	9.542	16 14 38.3	42.40	15 48.41	8.68	5 31.70	0.315	9 5
	9	Th	9 15 1.78	9.518	15 57 32.9	43.05	15 48.55	8.68	5 23.86	0.338	9 9
	10	Fr	9 18 49.93	9.495	+15 40 12.0	−43.69	15 48.70	8.68	−5 15.46	+0.362	9 13
	11	Sa	9 22 37.53	9.472	15 22 35.9	44.32	15 48.85	8.68	5 6.50	0.385	9 17
	12	Su	9 26 24.58	9.449	15 4 44.9	44.93	15 49.01	8.68	4 56.99	0.408	9 21
	13	Mo	9 30 11.08	9.426	14 46 39.4	45.53	15 49.17	8.69	4 46.94	0.430	9 25
	14	Tu	9 33 57.04	9.404	14 28 19.7	46.11	15 49.34	8.69	4 36.35	0.453	9 29
	15	We	9 37 42.47	9.382	+14 9 46.1	−46.68	15 49.51	8.69	−4 25.22	+0.475	9 33
	16	Th	9 41 27.37	9.360	+13 50 58.9	−47.24	15 49.68	8.69	−4 13.57	+0.496	9 37

FOR GREENWICH MEAN NOON

Date.	Day of the Year.	True Longitude.	Var. per Hour.	Latitude.	Logarithm of the Radius Vector of the Earth.	Var. per Hour.	Prec. in Long.	Nut. in Long.	Aberration.	True Obliquity.	Mean Time of Sidereal Noon.
		° ′ ″	″	″			″	″	″	23° 27′ ″	h m s
July 1	182	99 3 20.3	142.96	−0.39	0.007 1930	+ 1.4	24.98	+17.24	20.13	1.35	17 21 16.74
2	183	100 0 31.3	142.95	0.28	0.007 1956	0.8	25.12	17.28	20.13	1.35	17 17 20.83
3	184	100 57 42.0	142.95	0.15	0.007 1968	+ 0.2	25.26	17.32	20.13	1.35	17 13 24.92
4	185	101 54 52.6	142.94	−0.02	0.007 1965	− 0.4	25.40	17.36	20.13	1.34	17 9 29.01
5	186	102 52 3.2	142.94	+0.12	0.007 1949	1.0	25.53	17.40	20.13	1.34	17 5 33.09
6	187	103 49 13.9	142.96	+0.26	0.007 1919	− 1.6	25.67	+17.43	20.13	1.34	17 1 37.18
7	188	104 46 24.8	142.96	0.38	0.007 1874	2.2	25.81	17.47	20.13	1.34	16 57 41.27
8	189	105 43 36.0	142.97	0.48	0.007 1814	2.8	25.95	17.51	20.13	1.34	16 53 45.36
9	190	106 40 47.6	142.99	0.55	0.007 1739	3.5	26.09	17.54	20.13	1.34	16 49 49.45
10	191	107 37 59.6	143.01	0.59	0.007 1646	4.3	26.22	17.58	20.13	1.34	16 45 53.54
11	192	108 35 12.2	143.03	+0.60	0.007 1534	− 5.1	26.36	+17.62	20.13	1.34	16 41 57.63
12	193	109 32 25.3	143.06	0.57	0.007 1402	5.9	26.50	17.65	20.13	1.34	16 38 1.71
13	194	110 29 38.9	143.08	0.52	0.007 1248	6.9	26.64	17.68	20.13	1.34	16 34 5.80
14	195	111 26 53.1	143.10	0.43	0.007 1071	7.9	26.77	17.71	20.13	1.34	16 30 9.89
15	196	112 24 7.9	143.13	0.33	0.007 0871	8.9	26.91	17.75	20.13	1.34	16 26 13.98
16	197	113 21 23.2	143.15	+0.20	0.007 0646	− 9.9	27.05	+17.78	20.13	1.35	16 22 18.07
17	198	114 18 39.1	143.17	+0.06	0.007 0396	10.9	27.19	17.80	20.14	1.35	16 18 22.16
18	199	115 15 55.4	143.19	−0.07	0.007 0121	12.0	27.32	17.83	20.14	1.36	16 14 26.25
19	200	116 13 12.3	143.21	0.20	0.006 9820	13.0	27.46	17.86	20.14	1.36	16 10 30.34
20	201	117 10 29.6	143.23	0.32	0.006 9495	14.1	27.60	17.89	20.14	1.37	16 6 34.42
21	202	118 7 47.4	143.25	−0.42	0.006 9144	−15.1	27.74	+17.91	20.14	1.37	16 2 38.51
22	203	119 5 5.6	143.27	0.50	0.006 8769	16.1	27.87	17.94	20.14	1.37	15 58 42.60
23	204	120 2 24.2	143.29	0.56	0.006 8370	17.1	28.01	17.96	20.14	1.38	15 54 46.69
24	205	120 59 43.3	143.30	0.61	0.006 7948	18.0	28.15	17.98	20.15	1.39	15 50 50.78
25	206	121 57 2.8	143.32	0.62	0.006 7504	18.9	28.29	18.00	20.15	1.39	15 46 54.87
26	207	122 54 22.7	143.34	−0.61	0.006 7039	−19.8	28.42	+18.02	20.15	1.40	15 42 58.96
27	208	123 51 43.1	143.36	0.55	0.006 6554	20.6	28.56	18.04	20.15	1.41	15 39 3.05
28	209	124 49 3.9	143.38	0.48	0.006 6049	21.4	28.70	18.05	20.16	1.41	15 35 7.14
29	210	125 46 25.3	143.40	0.37	0.006 5527	22.1	28.84	18.07	20.16	1.42	15 31 11.23
30	211	126 43 47.1	143.42	0.25	0.006 4989	22.7	28.98	18.08	20.16	1.43	15 27 15.32
31	212	127 41 9.6	143.45	−0.13	0.006 4436	−23.3	29.11	+18.10	20.16	1.44	15 23 19.41
Aug. 1	213	128 38 32.7	143.48	+0.01	0.006 3870	23.8	29.25	18.11	20.17	1.44	15 19 23.50
2	214	129 35 56.5	143.51	0.15	0.006 3292	24.3	29.39	18.12	20.17	1.45	15 15 27.59
3	215	130 33 21.3	143.55	0.26	0.006 2702	24.8	29.53	18.12	20.17	1.46	15 11 31.68
4	216	131 30 47.0	143.59	0.36	0.006 2101	25.3	29.66	18.13	20.17	1.47	15 7 35.77
5	217	132 28 13.7	143.64	+0.44	0.006 1488	−25.8	29.80	+18.14	20.18	1.48	15 3 39.86
6	218	133 25 41.7	143.69	0.49	0.006 0864	26.3	29.94	18.14	20.18	1.48	14 59 43.95
7	219	134 23 10.9	143.75	0.51	0.006 0227	26.9	30.08	18.15	20.18	1.49	14 55 48.04
8	220	135 20 41.5	143.80	0.49	0.005 9575	27.5	30.21	18.15	20.19	1.50	14 51 52.13
9	221	136 18 13.4	143.86	0.44	0.005 8908	28.1	30.35	18.15	20.19	1.51	14 47 56.22
10	222	137 15 46.8	143.92	+0.36	0.005 8224	−28.8	30.49	+18.15	20.19	1.52	14 44 0.31
11	223	138 13 21.6	143.98	0.26	0.005 7523	29.6	30.63	18.15	20.20	1.53	14 40 4.40
12	224	139 10 57.8	144.04	0.14	0.005 6802	30.4	30.76	18.14	20.20	1.53	14 36 8.49
13	225	140 8 35.5	144.10	+0.01	0.005 6062	31.2	30.90	18.14	20.20	1.54	14 32 12.58
14	226	141 6 14.6	144.16	−0.11	0.005 5302	32.1	31.04	18.13	20.21	1.55	14 28 16.67
15	227	142 3 55.1	144.21	−0.23	0.005 4522	−33.0	31.18	+18.12	20.21	1.56	14 24 20.76
16	228	143 1 37.0	144.27	−0.35	0.005 3720	−33.9	31.31	+18.11	20.21	1.57	14 20 24.85

FOR GREENWICH MEAN NOON.

Date.	Day of the Week.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Semi-diameter.	Hor. Par.	Equation of Time. App.—Mean.	Var. per Hour.	Sidere or Righ sion S
		h m s	s	° ′ ″	″	′ ″	″	m s	s	h m
Aug. 16	Th	9 41 27.37	9.360	+13 50 58.9	−47.24	15 49.68	8.69	− 4 13.57	+0.496	9 3
17	Fr	9 45 11.76	9.339	13 31 58.5	47.79	15 49.86	8.69	4 1.40	0.518	9 4
18	Sa	9 48 55.63	9.317	13 12 45.2	48.32	15 50.05	8.70	3 48.72	0.539	9 4
19	Su	9 52 38.99	9.296	12 53 19.4	48.83	15 50.24	8.70	3 35.53	0.560	9 4
20	Mo	9 56 21.86	9.276	12 33 41.3	49.34	15 50.43	8.70	3 21.84	0.580	9 5
21	Tu	10 0 4.24	9.256	+12 13 51.3	−49.83	15 50.63	8.70	− 3 7.67	+0.600	9 5
22	We	10 3 46.15	9.236	11 53 49.8	50.30	15 50.83	8.70	2 53.02	0.620	10
23	Th	10 7 27.59	9.217	11 33 37.0	50.76	15 51.04	8.70	2 37.90	0.639	10
24	Fr	10 11 8.57	9.198	11 13 13.4	51.20	15 51.24	8.70	2 22.33	0.658	10
25	Sa	10 14 49.11	9.180	10 52 39.3	51.64	15 51.46	8.71	2 6.32	0.676	10 1
26	Su	10 18 29.22	9.162	+10 31 54.8	−52.06	15 51.67	8.71	− 1 49.87	+0.694	10 1
27	Mo	10 22 8.91	9.145	10 11 0.5	52.47	15 51.89	8.71	1 33.01	0.711	10 2
28	Tu	10 25 48.20	9.129	9 49 56.5	52.86	15 52.11	8.71	1 15.75	0.727	10 2
29	We	10 29 27.11	9.114	9 28 43.3	53.24	15 52.34	8.72	0 58.11	0.743	10 2
30	Th	10 33 5.66	9.099	9 7 21.1	53.61	15 52.56	8.72	0 40.10	0.758	10 3
31	Fr	10 36 43.86	9.085	+ 8 45 50.2	−53.97	15 52.79	8.72	− 0 21.74	+0.772	10 3
Sept. 1	Sa	10 40 21.73	9.072	8 24 10.8	54.31	15 53.01	8.72	− 0 3.06	0.785	10 4
2	Su	10 43 59.30	9.059	8 2 23.3	54.64	15 53.24	8.73	+ 0 15.92	0.797	10 4
3	Mo	10 47 36.59	9.048	7 40 28.0	54.96	15 53.47	8.73	0 35.19	0.808	10 4
4	Tu	10 51 13.62	9.038	7 18 25.2	55.27	15 53.70	8.73	0 54.71	0.818	10 5
5	We	10 54 50.41	9.028	+ 6 56 15.1	−55.57	15 53.94	8.73	+ 1 14.47	+0.828	10 5
6	Th	10 58 26.98	9.020	6 33 58.1	55.85	15 54.17	8.73	1 34.45	0.837	11
7	Fr	11 2 3.36	9.012	6 11 34.4	56.12	15 54.41	8.74	1 54.63	0.845	11
8	Sa	11 5 39.56	9.005	5 49 4.5	56.37	15 54.64	8.74	2 14.98	0.852	11
9	Su	11 9 15.60	8.998	5 26 28.7	56.61	15 54.88	8.74	2 35.50	0.858	11 1
10	Mo	11 12 51.49	8.993	+ 5 3 47.2	−56.84	15 55.13	8.74	+ 2 56.16	+0.863	11 1
11	Tu	11 16 27.26	8.988	4 41 0.4	57.05	15 55.37	8.74	3 16.94	0.868	11 1
12	We	11 20 2.92	8.984	4 18 8.7	57.25	15 55.62	8.75	3 37.83	0.873	11 2
13	Th	11 23 38.49	8.981	3 55 12.5	57.43	15 55.87	8.75	3 58.82	0.876	11 2
14	Fr	11 27 13.99	8.978	3 32 12.0	57.60	15 56.12	8.75	4 19.87	0.879	11 3
15	Sa	11 30 49.43	8.976	+ 3 9 7.7	−57.76	15 56.38	8.75	+ 4 40.99	+0.881	11 3
16	Su	11 34 24.83	8.974	2 45 59.8	57.90	15 56.63	8.76	5 2.14	0.882	11 3
17	Mo	11 38 0.20	8.974	2 22 48.7	58.02	15 56.90	8.76	5 23.32	0.883	11 4
18	Tu	11 41 35.57	8.974	1 59 34.8	58.13	15 57.16	8.76	5 44.50	0.882	11 4
19	We	11 45 10.96	8.975	1 36 18.5	58.23	15 57.43	8.76	6 5.67	0.881	11 5
20	Th	11 48 46.37	8.976	+ 1 13 0.0	−58.31	15 57.70	8.77	+ 6 26.80	+0.880	11 5
21	Fr	11 52 21.83	8.979	0 49 39.8	58.37	15 57.97	8.77	6 47.90	0.878	11 5
22	Sa	11 55 57.35	8.982	0 26 18.3	58.42	15 58.24	8.77	7 8.93	0.875	12
23	Su	11 59 32.96	8.986	+ 0 2 55.6	58.46	15 58.52	8.77	7 29.88	0.871	12
24	Mo	12 3 8.67	8.990	− 0 20 27.8	58.48	15 58.80	8.78	7 50.72	0.866	12 1
25	Tu	12 6 44.50	8.996	− 0 43 51.5	−58.49	15 59.07	8.78	+ 8 11.45	+0.861	12 1
26	We	12 10 20.47	9.002	1 7 15.3	58.49	15 59.35	8.78	8 32.03	0.854	12 1
27	Th	12 13 56.60	9.009	1 30 38.7	58.47	15 59.63	8.78	8 52.45	0.847	12 2
28	Fr	12 17 32.91	9.017	1 54 1.6	58.44	15 59.91	8.79	9 12.69	0.839	12 2
29	Sa	12 21 9.44	9.027	2 17 23.5	58.39	16 0.18	8.79	9 32.71	0.830	12 3
30	Su	12 24 46.20	9.037	− 2 40 44.1	−58.33	16 0.46	8.79	+ 9 52.50	+0.820	12 3
Oct. 1	Mo	12 28 23.22	9.048	− 3 4 3.2	−58.26	16 0.74	8.79	+10 12.04	+0.808	12 3

FOR GREENWICH MEAN NOON.

Date.	Day of the Year.	True Longitude.	Var. per Hour.	Latitude.	Logarithm of the Radius Vector of the Earth.	Var. per Hour.	Prec. in Long.	Nut. in Long.	Aberration.	True Obliquity.	Mean Time of Sidereal Noon.
		° ′ ″	″	″			″	″	″	23° 27′ ″	h m s
Aug. 16	228	143 1 37.0	144.27	−0.35	0.005 3720	−33.9	31.31	+18.11	20.21	1.57	14 20 24.85
17	229	143 59 20.2	144.33	0.46	0.005 2897	34.7	31.45	18.10	20.22	1.58	14 16 28.94
18	230	144 57 4.8	144.39	0.55	0.005 2054	35.6	31.59	18.09	20.22	1.58	14 12 33.03
19	231	145 54 50.7	144.44	0.62	0.005 1190	36.4	31.73	18.08	20.22	1.59	14 8 37.13
20	232	146 52 37.9	144.49	0.66	0.005 0307	37.2	31.86	18.06	20.23	1.60	14 4 41.22
21	233	147 50 26.4	144.55	−0.67	0.004 9404	−38.0	32.00	+18.05	20.23	1.61	14 0 45.31
22	234	148 48 16.1	144.60	0.66	0.004 8482	38.8	32.14	18.03	20.24	1.61	13 56 49.40
23	235	149 46 7.1	144.65	0.62	0.004 7543	39.5	32.28	18.01	20.24	1.62	13 52 53.49
24	236	150 43 59.3	144.70	0.56	0.004 6586	40.2	32.42	17.99	20.25	1.63	13 48 57.58
25	237	151 41 52.7	144.75	0.46	0.004 5615	40.8	32.55	17.97	20.25	1.63	13 45 1.68
26	238	152 39 47.4	144.80	−0.35	0.004 4629	−41.3	32.69	+17.95	20.26	1.64	13 41 5.77
27	239	153 37 43.3	144.86	0.22	0.004 3631	41.8	32.83	17.92	20.26	1.64	13 37 9.86
28	240	154 35 40.5	144.91	−0.10	0.004 2622	42.2	32.97	17.90	20.26	1.65	13 33 13.95
29	241	155 33 39.0	144.97	+0.04	0.004 1604	42.6	33.10	17.87	20.27	1.65	13 29 18.04
30	242	156 31 38.9	145.03	0.16	0.004 0579	42.9	33.24	17.85	20.27	1.66	13 25 22.14
31	243	157 29 40.3	145.09	+0.27	0.003 9547	−43.1	33.38	+17.82	20.28	1.66	13 21 26.23
Sept. 1	244	158 27 43.2	145.16	0.35	0.003 8509	43.3	33.52	17.79	20.28	1.66	13 17 30.32
2	245	159 25 47.8	145.23	0.40	0.003 7467	43.5	33.65	17.76	20.29	1.67	13 13 34.41
3	246	160 23 54.2	145.30	0.42	0.003 6421	43.7	33.79	17.73	20.29	1.67	13 9 38.51
4	247	161 22 2.5	145.38	0.42	0.003 5369	44.0	33.93	17.70	20.30	1.67	13 5 42.60
5	248	162 20 12.6	145.47	+0.37	0.003 4311	−44.2	34.07	+17.66	20.30	1.67	13 1 46.69
6	249	163 18 24.8	145.55	0.30	0.003 3247	44.5	34.20	17.63	20.31	1.67	12 57 50.78
7	250	164 16 39.0	145.63	0.20	0.003 2175	44.9	34.34	17.60	20.31	1.67	12 53 54.88
8	251	165 14 55.3	145.72	+0.09	0.003 1093	45.3	34.48	17.56	20.32	1.67	12 49 58.97
9	252	166 13 13.6	145.81	−0.03	0.003 0002	45.7	34.62	17.52	20.32	1.67	12 46 3.06
10	253	167 11 34.1	145.89	−0.16	0.002 8900	−46.1	34.75	+17.49	20.33	1.67	12 42 7.16
11	254	168 9 56.6	145.98	0.28	0.002 7787	46.6	34.89	17.45	20.33	1.67	12 38 11.25
12	255	169 8 21.1	146.07	0.41	0.002 6662	47.1	35.03	17.41	20.34	1.67	12 34 15.34
13	256	170 6 47.7	146.15	0.51	0.002 5524	47.7	35.17	17.37	20.34	1.67	12 30 19.44
14	257	171 5 16.3	146.23	0.60	0.002 4374	48.2	35.30	17.33	20.35	1.66	12 26 23.53
15	258	172 3 46.9	146.31	−0.66	0.002 3211	−48.7	35.44	+17.30	20.36	1.66	12 22 27.62
16	259	173 2 19.4	146.39	0.70	0.002 2035	49.3	35.58	17.26	20.36	1.65	12 18 31.71
17	260	174 0 53.8	146.47	0.73	0.002 0847	49.8	35.72	17.22	20.37	1.65	12 14 35.81
18	261	174 59 30.1	146.55	0.73	0.001 9647	50.3	35.86	17.17	20.37	1.64	12 10 39.90
19	262	175 58 8.3	146.63	0.70	0.001 8435	50.7	35.99	17.13	20.38	1.63	12 6 43.99
20	263	176 56 48.2	146.70	−0.63	0.001 7213	−51.1	36.13	+17.09	20.38	1.63	12 2 48.09
21	264	177 55 29.9	146.77	0.54	0.001 5982	51.5	36.27	17.05	20.39	1.62	11 58 52.18
22	265	178 54 13.3	146.84	0.44	0.001 4741	51.8	36.41	17.01	20.39	1.61	11 54 56.27
23	266	179 52 58.4	146.91	0.32	0.001 3494	52.1	36.54	16.97	20.40	1.60	11 51 0.37
24	267	180 51 45.3	146.99	0.18	0.001 2241	52.3	36.68	16.93	20.41	1.59	11 47 4.46
25	268	181 50 33.8	147.06	−0.05	0.001 0984	−52.4	36.82	+16.88	20.41	1.58	11 43 8.55
26	269	182 49 24.0	147.13	+0.07	0.000 9724	52.5	36.96	16.84	20.42	1.57	11 39 12.64
27	270	183 48 16.0	147.20	0.18	0.000 8465	52.5	37.09	16.80	20.42	1.56	11 35 16.74
28	271	184 47 9.7	147.28	0.26	0.000 7206	52.4	37.23	16.76	20.43	1.55	11 31 20.83
29	272	185 46 5.2	147.35	0.31	0.000 5951	52.2	37.37	16.72	20.44	1.54	11 27 24.92
30	273	186 45 2.7	147.44	+0.34	0.000 4700	−52.1	37.51	+16.68	20.44	1.52	11 23 29.02
Oct. 1	274	187 44 2.2	147.52	+0.33	0.000 3453	−51.9	37.64	+16.64	20.45	1.51	11 19 33.11

FOR GREENWICH MEAN NOON.

Date.	Day of the Week.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Semi-diameter.	Hor. Par.	Equation of Time. App.—Mean.	Var. per Hour.	Sidereal Time or Right Ascension
		h m s	s	° ′ ″	″	′ ″	″	m s	s	h
Oct. 1	Mo	12 28 23.22	9.048	− 3 4 3.2	−58.26	16 0.74	8.79	+10 12.04	+0.808	12
2	Tu	12 32 0.53	9.061	3 27 20.4	58.17	16 1.01	8.80	10 31.28	0.796	12
3	We	12 35 38.14	9.074	3 50 35.3	58.07	16 1.29	8.80	10 50.22	0.782	12
4	Th	12 39 16.09	9.089	4 13 47.7	57.96	16 1.56	8.80	11 8.82	0.768	12
5	Fr	12 42 54.40	9.104	4 36 57.2	57.83	16 1.83	8.80	11 27.07	0.753	12
6	Sa	12 46 33.09	9.120	− 5 0 3.5	−57.69	16 2.10	8.81	+11 44.94	+0.736	12
7	Su	12 50 12.17	9.137	5 23 6.1	57.53	16 2.37	8.81	12 2.40	0.719	13
8	Mo	12 53 51.68	9.155	5 46 4.7	57.35	16 2.64	8.81	12 19.45	0.701	13
9	Tu	12 57 31.63	9.174	6 8 58.9	57.16	16 2.92	8.81	12 36.06	0.682	13
10	We	13 1 12.03	9.193	6 31 48.3	56.96	16 3.19	8.82	12 52.20	0.663	13
11	Th	13 4 52.91	9.214	− 6 54 32.7	−56.74	16 3.46	8.82	+13 7.87	+0.643	13
12	Fr	13 8 34.29	9.235	7 17 11.5	56.49	16 3.73	8.82	13 23.05	0.622	13
13	Sa	13 12 16.18	9.256	7 39 44.3	56.24	16 4.00	8.82	13 37.72	0.600	13
14	Su	13 15 58.59	9.278	8 2 10.9	55.97	16 4.28	8.83	13 51.86	0.578	13
15	Mo	13 19 41.54	9.301	8 24 30.7	55.68	16 4.55	8.83	14 5.46	0.555	13
16	Tu	13 23 25.06	9.325	− 8 46 43.5	−55.38	16 4.82	8.83	+14 18.50	+0.531	13
17	We	13 27 9.15	9.349	9 8 48.7	55.06	16 5.10	8.83	14 30.96	0.507	13
18	Th	13 30 53.82	9.374	9 30 46.0	54.72	16 5.37	8.84	14 42.85	0.483	13
19	Fr	13 34 39.09	9.399	9 52 34.9	54.36	16 5.65	8.84	14 54.13	0.457	13
20	Sa	13 38 24.97	9.425	10 14 15.1	53.99	16 5.92	8.84	15 4.80	0.432	13
21	Su	13 42 11.48	9.451	−10 35 46.3	−53.60	16 6.20	8.84	+15 14.84	+0.405	13
22	Mo	13 45 58.63	9.478	10 57 7.9	53.19	16 6.47	8.85	15 24.25	0.379	14
23	Tu	13 49 46.43	9.505	11 18 19.5	52.77	16 6.75	8.85	15 33.01	0.351	14
24	We	13 53 34.89	9.533	11 39 20.8	52.33	16 7.02	8.85	15 41.09	0.323	14
25	Th	13 57 24.04	9.562	12 0 11.5	51.88	16 7.29	8.85	15 48.50	0.295	14
26	Fr	14 1 13.88	9.591	−12 20 51.1	−51.41	16 7.56	8.86	+15 55.22	+0.265	14
27	Sa	14 5 4.43	9.621	12 41 19.2	50.93	16 7.82	8.86	16 1.22	0.235	14
28	Su	14 8 55.71	9.652	13 1 35.4	50.43	16 8.09	8.86	16 6.49	0.204	14
29	Mo	14 12 47.73	9.683	13 21 39.5	49.91	16 8.35	8.86	16 11.03	0.173	14
30	Tu	14 16 40.51	9.715	13 41 30.9	49.37	16 8.60	8.87	16 14.80	0.141	14
31	We	14 20 34.07	9.748	−14 1 9.3	−48.82	16 8.86	8.87	+16 17.80	+0.108	14
Nov. 1	Th	14 24 28.42	9.781	14 20 34.4	48.26	16 9.11	8.87	16 20.00	0.075	14
2	Fr	14 28 23.57	9.815	14 39 45.7	47.68	16 9.35	8.87	16 21.40	0.042	14
3	Sa	14 32 19.54	9.849	14 58 42.9	47.08	16 9.59	8.87	16 21.99	+0.007	14
4	Su	14 36 16.34	9.884	15 17 25.4	46.46	16 9.83	8.88	16 21.75	−0.028	14
5	Mo	14 40 13.98	9.919	−15 35 53.0	−45.83	16 10.07	8.88	+16 20.66	−0.063	14
6	Tu	14 44 12.47	9.955	15 54 5.2	45.18	16 10.30	8.88	16 18.73	0.098	15
7	We	14 48 11.80	9.990	16 12 1.6	44.51	16 10.54	8.88	16 15.95	0.133	15
8	Th	14 52 11.99	10.026	16 29 41.8	43.83	16 10.77	8.88	16 12.32	0.169	15
9	Fr	14 56 13.04	10.062	16 47 5.3	43.13	16 10.99	8.89	16 7.82	0.205	15
10	Sa	15 0 14.96	10.098	−17 4 11.7	−42.41	16 11.22	8.89	+16 2.46	−0.241	15
11	Su	15 4 17.73	10.134	17 21 0.7	41.67	16 11.44	8.89	15 56.25	0.277	15
12	Mo	15 8 21.37	10.169	17 37 31.8	40.92	16 11.66	8.89	15 49.17	0.313	15
13	Tu	15 12 25.86	10.205	17 53 44.7	40.15	16 11.88	8.90	15 41.23	0.349	15
14	We	15 16 31.21	10.241	18 9 38.8	39.36	16 12.10	8.90	15 32.43	0.384	15
15	Th	15 20 37.41	10.276	−18 25 13.8	−38.55	16 12.31	8.90	+15 22.79	−0.419	15
16	Fr	15 24 44.46	10.311	−18 40 29.3	−37.73	16 12.53	8.90	+15 12.30	−0.454	15

FOR GREENWICH MEAN NOON.

Date.		Day of the Week.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Semi-diameter.	Hor. Par.	Equation of Time. App.—Mean.	Var. per Hour.	Sidereal Time or Right Ascension
			h m s	s	° ′ ″	″	′ ″	″	m s	s	h
Nov.	16	Fr	15 24 44.46	10.311	−18 40 29.3	−37.73	16 12.53	8.90	+15 12.30	−0.454	15
	17	Sa	15 28 52.34	10.345	18 55 24.9	36.90	16 12.74	8.90	15 0.98	0.489	15
	18	Su	15 33 1.04	10.380	19 10 0.2	36.05	16 12.95	8.90	14 48.83	0.523	15
	19	Mo	15 37 10.56	10.413	19 24 14.9	35.18	16 13.16	8.91	14 35.87	0.557	15
	20	Tu	15 41 20.88	10.447	19 38 8.5	34.29	16 13.36	8.91	14 22.10	0.590	15
	21	We	15 45 32.00	10.480	−19 51 40.6	−33.39	16 13.56	8.91	+14 7.54	−0.623	15
	22	Th	15 49 43.90	10.512	20 4 51.0	32.48	16 13.76	8.91	13 52.19	0.655	16
	23	Fr	15 53 56.58	10.544	20 17 39.3	31.54	16 13.96	8.91	13 36.08	0.687	16
	24	Sa	15 58 10.02	10.576	20 30 5.0	30.60	16 14.14	8.92	13 19.20	0.719	16
	25	Su	16 2 24.21	10.607	20 42 8.0	29.65	16 14.33	8.92	13 1.56	0.750	16
	26	Mo	16 6 39.14	10.637	−20 53 47.9	−28.68	16 14.51	8.92	+12 43.19	−0.781	16
	27	Tu	16 10 54.80	10.668	21 5 4.3	27.69	16 14.69	8.92	12 24.09	0.811	16
	28	We	16 15 11.18	10.697	21 15 57.0	26.70	16 14.86	8.92	12 4.26	0.841	16
	29	Th	16 19 28.26	10.726	21 26 25.6	25.69	16 15.02	8.92	11 43.73	0.870	16
	30	Fr	16 23 46.04	10.755	21 36 29.8	24.66	16 15.18	8.93	11 22.51	0.898	16
Dec.	1	Sa	16 28 4.50	10.783	−21 46 9.4	−23.63	16 15.34	8.93	+11 0.61	−0.926	16
	2	Su	16 32 23.62	10.810	21 55 24.0	22.58	16 15.49	8.93	10 38.05	0.953	16
	3	Mo	16 36 43.38	10.836	22 4 13.3	21.52	16 15.63	8.93	10 14.85	0.980	16
	4	Tu	16 41 3.76	10.862	22 12 37.1	20.46	16 15.77	8.93	9 51.02	1.005	16
	5	We	16 45 24.75	10.887	22 20 35.1	19.38	16 15.90	8.93	9 26.60	1.030	16
	6	Th	16 49 46.31	10.910	−22 28 7.1	−18.29	16 16.03	8.93	+ 9 1.59	−1.054	16
	7	Fr	16 54 8.42	10.932	22 35 12.8	17.19	16 16.15	8.93	8 36.04	1.076	17
	8	Sa	16 58 31.05	10.954	22 41 52.0	16.08	16 16.27	8.94	8 9.96	1.097	17
	9	Su	17 2 54.18	10.974	22 48 4.4	14.96	16 16.39	8.94	7 43.39	1.117	17
	10	Mo	17 7 17.78	10.993	22 53 49.9	13.83	16 16.50	8.94	7 16.35	1.136	17
	11	Tu	17 11 41.82	11.010	−22 59 8.3	−12.70	16 16.61	8.94	+ 6 48.87	−1.153	17
	12	We	17 16 6.25	11.026	23 3 59.3	11.56	16 16.71	8.94	6 21.00	1.169	17
	13	Th	17 20 31.05	11.041	23 8 22.9	10.41	16 16.82	8.94	5 52.75	1.184	17
	14	Fr	17 24 56.19	11.054	23 12 18.8	9.25	16 16.91	8.94	5 24.18	1.197	17
	15	Sa	17 29 21.62	11.065	23 15 47.0	8.09	16 17.01	8.94	4 55.30	1.209	17
	16	Su	17 33 47.31	11.075	−23 18 47.3	− 6.93	16 17.10	8.94	+ 4 26.17	−1.219	17
	17	Mo	17 38 13.22	11.084	23 21 19.6	5.76	16 17.18	8.94	3 56.82	1.227	17
	18	Tu	17 42 39.32	11.091	23 23 23.8	4.59	16 17.27	8.94	3 27.28	1.234	17
	19	We	17 47 5.56	11.096	23 24 59.9	3.42	16 17.35	8.95	2 57.60	1.239	17
	20	Th	17 51 31.91	11.100	23 26 7.9	2.24	16 17.42	8.95	2 27.81	1.243	17
	21	Fr	17 55 58.33	11.102	−23 26 47.6	− 1.07	16 17.49	8.95	+ 1 57.94	−1.245	17
	22	Sa	18 0 24.79	11.103	23 26 59.1	+ 0.11	16 17.56	8.95	1 28.04	1.246	18
	23	Su	18 4 51.26	11.103	23 26 42.4	1.29	16 17.61	8.95	0 58.13	1.246	18
	24	Mo	18 9 17.70	11.101	23 25 57.4	2.46	16 17.67	8.95	+ 0 28.24	1.244	18
	25	Tu	18 13 44.09	11.098	23 24 44.2	3.64	16 17.72	8.95	− 0 1.58	1.241	18
	26	We	18 18 10.38	11.093	−23 23 2.8	+ 4.81	16 17.76	8.95	− 0 31.32	−1.237	18
	27	Th	18 22 36.56	11.088	23 20 53.3	5.98	16 17.80	8.95	1 0.94	1.231	18
	28	Fr	18 27 2.59	11.081	23 18 15.6	7.15	16 17.83	8.95	1 30.41	1.225	18
	29	Sa	18 31 28.45	11.073	23 15 9.9	8.32	16 17.85	8.95	1 59.71	1.217	18
	30	Su	18 35 54.10	11.064	23 11 36.2	9.48	16 17.87	8.95	2 28.80	1.208	18
	31	Mo	18 40 19.51	11.053	−23 7 34.7	+10.64	16 17.88	8.95	− 2 57.66	−1.197	18
	32	Tu	18 44 44.66	11.042	−23 3 5.4	+11.80	16 17.88	8.95	− 3 26.25	−1.185	18

FOR GREENWICH MEAN NOON.

ate.	Day of the Year.	True Longitude.	Var. per Hour.	Latitude.	Logarithm of the Radius Vector of the Earth.	Var. per Hour.	Prec. in Long.	Nut. in Long.	Aberration.	True Obliquity.	Mean Time of Sidereal Noon.
		° ′ ″	″	″			″	″	″	23° 26′ ″	h m s
v. 16	320	233 34 42.0	151.30	−0.44	9.995 0455	−39.6	43.97	+15.86	20.70	60.37	8 18 41.32
17	321	234 35 14.0	151.36	0.31	9.994 9510	39.2	44.11	15.87	20.70	60.34	8 14 45.41
18	322	235 35 47.4	151.42	0.17	9.994 8574	38.8	44.25	15.89	20.71	60.31	8 10 49.50
19	323	236 36 22.0	151.47	−0.04	9.994 7649	38.3	44.39	15.91	20.71	60.28	8 6 53.59
20	324	237 36 57.9	151.52	+0.08	9.994 6736	37.8	44.52	15.93	20.72	60.25	8 2 57.68
21	325	238 37 35.0	151.57	+0.17	9.994 5837	−37.1	44.66	+15.95	20.72	60.23	7 59 1.77
22	326	239 38 13.2	151.61	0.24	9.994 4955	36.4	44.80	15.98	20.73	60.20	7 55 5.86
23	327	240 38 52.5	151.66	0.28	9.994 4089	35.7	44.94	16.00	20.73	60.17	7 51 9.95
24	328	241 39 32.9	151.71	0.29	9.994 3243	34.8	45.08	16.03	20.73	60.14	7 47 14.04
25	329	242 40 14.4	151.75	0.27	9.994 2417	34.0	45.21	16.06	20.74	60.12	7 43 18.13
26	330	243 40 57.0	151.80	+0.21	9.994 1613	−33.0	45.35	+16.09	20.74	60.09	7 39 22.21
27	331	244 41 40.7	151.85	0.12	9.994 0832	32.0	45.49	16.12	20.75	60.07	7 35 26.30
28	332	245 42 25.7	151.90	+0.02	9.994 0076	31.0	45.63	16.15	20.75	60.04	7 31 30.39
29	333	246 43 11.8	151.95	−0.10	9.993 9344	30.0	45.76	16.19	20.75	60.02	7 27 34.48
30	334	247 43 59.2	152.00	0.23	9.993 8636	29.0	45.90	16.22	20.76	59.99	7 23 38.57
ec. 1	335	248 44 47.9	152.06	−0.36	9.993 7953	−28.0	46.04	+16.25	20.76	59.97	7 19 42.66
2	336	249 45 38.0	152.11	0.49	9.993 7294	27.0	46.18	16.29	20.76	59.95	7 15 46.74
3	337	250 46 29.3	152.17	0.60	9.993 6658	26.0	46.31	16.33	20.76	59.92	7 11 50.83
4	338	251 47 22.0	152.22	0.71	9.993 6044	25.1	46.45	16.37	20.77	59.90	7 7 54.92
5	339	252 48 16.0	152.28	0.78	9.993 5451	24.2	46.59	16.41	20.77	59.88	7 3 59.01
6	340	253 49 11.2	152.33	−0.84	9.993 4880	−23.4	46.73	+16.45	20.77	59.86	7 0 3.10
7	341	254 50 7.8	152.38	0.85	9.993 4328	22.6	46.86	16.49	20.78	59.84	6 56 7.18
8	342	255 51 5.5	152.43	0.85	9.993 3796	21.8	47.00	16.53	20.78	59.82	6 52 11.27
9	343	256 52 4.4	152.48	0.82	9.993 3282	21.1	47.14	16.58	20.78	59.80	6 48 15.36
10	344	257 53 4.4	152.52	0.76	9.993 2785	20.3	47.28	16.62	20.78	59.78	6 44 19.45
11	345	258 54 5.5	152.57	−0.68	9.993 2306	−19.6	47.41	+16.67	20.79	59.77	6 40 23.54
12	346	259 55 7.6	152.60	0.58	9.993 1842	19.0	47.55	16.71	20.79	59.75	6 36 27.62
13	347	260 56 10.6	152.64	0.46	9.993 1394	18.4	47.69	16.76	20.79	59.73	6 32 31.71
14	348	261 57 14.4	152.67	0.31	9.993 0960	17.8	47.83	16.81	20.79	59.72	6 28 35.80
15	349	262 58 18.9	152.70	0.17	9.993 0542	17.1	47.96	16.85	20.79	59.70	6 24 39.89
16	350	263 59 24.0	152.72	−0.04	9.993 0139	−16.5	48.10	+16.90	20.80	59.69	6 20 43.98
17	351	265 0 29.6	152.74	+0.09	9.992 9751	15.8	48.24	16.95	20.80	59.67	6 16 48.06
18	352	266 1 35.6	152.76	0.21	9.992 9380	15.1	48.38	17.00	20.80	59.66	6 12 52.15
19	353	267 2 41.9	152.77	0.29	9.992 9027	14.3	48.52	17.04	20.80	59.65	6 8 56.24
20	354	268 3 48.4	152.78	0.35	9.992 8693	13.5	48.65	17.09	20.80	59.63	6 5 0.33
21	355	269 4 55.1	152.78	+0.37	9.992 8381	−12.6	48.79	+17.14	20.80	59.62	6 1 4.41
22	356	270 6 2.0	152.79	0.35	9.992 8090	11.6	48.93	17.19	20.81	59.61	5 57 8.50
23	357	271 7 9.0	152.79	0.31	9.992 7824	10.6	49.07	17.24	20.81	59.60	5 53 12.59
24	358	272 8 16.1	152.80	0.23	9.992 7583	9.5	49.20	17.29	20.81	59.59	5 49 16.67
25	359	273 9 23.4	152.81	0.14	9.992 7368	8.4	49.34	17.34	20.81	59.59	5 45 20.76
26	360	274 10 30.7	152.81	+0.02	9.992 7181	− 7.2	49.48	+17.39	20.81	59.58	5 41 24.85
27	361	275 11 38.2	152.82	−0.12	9.992 7022	6.0	49.62	17.43	20.81	59.57	5 37 28.94
28	362	276 12 45.9	152.82	0.24	9.992 6891	4.8	49.75	17.48	20.81	59.57	5 33 33.03
29	363	277 13 53.8	152.83	0.37	9.992 6790	3.6	49.89	17.53	20.81	59.56	5 29 37.11
30	364	278 15 1.9	152.84	0.50	9.992 6716	2.5	50.03	17.58	20.81	59.56	5 25 41.20
31	365	279 16 10.2	152.85	−0.61	9.992 6670	− 1.4	50.17	+17.62	20.81	59.55	5 21 45.29
32	366	280 17 18.8	152.86	−0.69	9.992 6651	− 0.2	50.30	+17.67	20.81	59.55	5 17 49.38

39398°—1917——2

GREENWICH MEAN TIME.

GREENWICH MEAN TIME.

Date.	X True Equinox. Noon.	X True Equinox. Midnight.	Reduc. to Mean Eq'x of 1917.0. Noon.	Y True Equinox. Noon.	Y True Equinox. Midnight.	Reduc. to Mean Eq'x of 1917.0. Noon.	Z True Equinox. Noon.	Z True Equinox. Midnight.	Reduc. to Mean Eq'x of 1917.0. Noon.
July 1	−0.160 0222	−0.168 3677	+2055	+0.921 1012	+0.919 8514	+ 325	+0.399 5559	+0.399 0141	[illegible]
2	0.176 7011	0.185 0219	2058	0.918 5373	0.917 1589	358	0.398 4443	0.397 8467	[illegible]
3	0.193 3296	0.201 6237	2060	0.915 7164	0.914 2098	391	0.397 2214	0.396 5682	[illegible]
4	0.209 9035	0.218 1686	2062	0.912 6392	0.911 0049	424	0.395 8871	0.395 1784	[illegible]
5	0.226 4184	0.234 6525	2063	0.909 3069	0.907 5451	457	0.394 4422	0.393 6784	[illegible]
6	−0.242 8703	−0.251 0713	+2063	+0.905 7197	+0.903 8309	+ 490	+0.392 8871	+0.392 0681	[illegible]
7	0.259 2549	0.267 4206	2062	0.901 8789	0.899 8637	523	0.391 2216	0.390 3477	[illegible]
8	0.275 5678	0.283 6961	2061	0.897 7854	0.895 6440	557	0.389 4464	0.388 5178	[illegible]
9	0.291 8049	0.299 8936	2059	0.893 4397	0.891 1727	590	0.387 5618	0.386 5785	[illegible]
10	0.307 9616	0.316 0083	2057	0.888 8429	0.886 4504	624	0.385 5680	0.384 5302	[illegible]
11	−0.324 0332	−0.332 0357	+2054	+0.883 9955	+0.881 4783	+ 657	+0.383 4653	+0.382 3733	+220
12	0.340 0151	0.347 9709	2050	0.878 8989	0.876 2575	691	0.381 2543	0.380 1084	235
13	0.355 9026	0.363 8096	2045	0.873 5541	0.870 7888	725	0.378 9355	0.377 7357	250
14	0.371 6912	0.379 5469	2040	0.867 9618	0.865 0734	759	0.376 5091	0.375 2559	265
15	0.387 3759	0.395 1778	2034	0.862 1238	0.859 1130	793	0.373 9762	0.372 6700	280
16	−0.402 9519	−0.410 6977	+2027	+0.856 0414	+0.852 9092	+ 827	+0.371 3373	+0.369 9782	+295
17	0.418 4145	0.426 1018	2020	0.849 7166	0.846 4637	861	0.368 5929	0.367 1815	310
18	0.433 7589	0.441 3853	2012	0.843 1509	0.839 7782	894	0.365 7441	0.364 2807	325
19	0.448 9805	0.456 5439	2003	0.836 3459	0.832 8545	928	0.362 7915	0.361 2767	340
20	0.464 0749	0.471 5729	1993	0.829 3041	0.825 6949	962	0.359 7363	0.358 1704	355
21	−0.479 0373	−0.486 4676	+1983	+0.822 0272	+0.818 3014	+ 996	+0.356 5792	+0.354 9628	+370
22	0.493 8633	0.501 2238	1972	0.814 5177	0.810 6763	1029	0.353 3213	0.351 6548	384
23	0.508 5487	0.515 8374	1960	0.806 7776	0.802 8219	1063	0.349 9635	0.348 2474	399
24	0.523 0892	0.530 3036	1947	0.798 8095	0.794 7406	1096	0.346 5068	0.344 7418	414
25	0.537 4802	0.544 6186	1934	0.790 6158	0.786 4353	1129	0.342 9525	0.341 1390	429
26	−0.551 7181	−0.558 7783	+1920	+0.782 1994	+0.777 9082	+1162	+0.339 3016	+0.337 4403	+443
27	0.565 7987	0.572 7787	1905	0.773 5622	0.769 1616	1195	0.335 5553	0.333 6466	458
28	0.579 7179	0.586 6159	1889	0.764 7069	0.760 1985	1227	0.331 7144	0.329 7590	472
29	0.593 4723	0.600 2865	1873	0.755 6367	0.751 0218	1260	0.327 7805	0.325 7790	487
30	0.607 0580	0.613 7864	1856	0.746 3541	0.741 6341	1292	0.323 7546	0.321 7075	501
31	−0.620 4714	−0.627 1126	+1838	+0.736 8620	+0.732 0381	+1324	+0.319 6378	+0.317 5457	+516
Aug. 1	0.633 7094	0.640 2615	1820	0.727 1628	0.722 2365	1356	0.315 4312	0.313 2946	530
2	0.646 7684	0.653 2297	1801	0.717 2594	0.712 2318	1388	0.311 1360	0.308 9555	544
3	0.659 6450	0.666 0140	1781	0.707 1542	0.702 0269	1419	0.306 7533	0.304 5294	558
4	0.672 3361	0.678 6110	1760	0.696 8501	0.691 6240	1450	0.302 2840	0.300 0173	572
5	−0.684 8381	−0.691 0171	+1739	+0.686 3491	+0.681 0257	+1481	+0.297 7294	+0.295 4204	+586
6	0.697 1476	0.703 2291	1717	0.675 6542	0.670 2347	1512	0.293 0904	0.290 7396	600
7	0.709 2611	0.715 2433	1694	0.664 7676	0.659 2533	1542	0.288 3681	0.285 9760	613
8	0.721 1752	0.727 0561	1671	0.653 6920	0.648 0841	1572	0.283 5636	0.281 1309	627
9	0.732 8858	0.738 6638	1647	0.642 4300	0.636 7300	1601	0.278 6781	0.276 2053	640
10	−0.744 3897	−0.750 0628	+1622	+0.630 9844	+0.625 1938	+1630	+0.273 7127	+0.271 2006	+654
11	0.755 6828	0.761 2491	1597	0.619 3584	0.613 4785	1659	0.268 6691	0.266 1182	667
12	0.766 7614	0.772 2192	1571	0.607 5547	0.601 5873	1687	0.263 5482	0.260 9593	680
13	0.777 6221	0.782 9697	1544	0.595 5768	0.589 5237	1715	0.258 3517	0.255 7256	693
14	0.788 2615	0.793 4970	1516	0.583 4282	0.577 2907	1743	0.253 0812	0.250 4186	706
15	−0.798 6759	−0.803 7976	+1488	+0.571 1118	+0.564 8919	+1770	+0.247 7381	+0.245 0397	+718
	[illegible]8619	−0.813 8684	+1459	+0.558 6315	+0.552 3309	+1797	+0.242 3236	+0.239 5902	+730

GREENWICH MEAN TIME.

Date.	X True Equinox. Noon.	X True Equinox. Midnight.	Reduc. to Mean Eq'x of 1917.0. Noon.	Y True Equinox. Noon.	Y True Equinox. Midnight.	Reduc. to Mean Eq'x of 1917.0. Noon.	Z True Equinox. Noon.	Z True Equinox. Midnight.	Reduc. to Mean Eq'x of 1917.0. Noon.
ug. 16	−0.808 8619	−0.813 8684	+1459	+0.558 6315	+0.552 3309	+1797	+0.242 3236	+0.239 5902	+ 730
17	0.818 8164	0.823 7057	1430	0.545 9908	0.539 6115	1823	0.236 8397	0.234 0722	742
18	0.828 5360	0.833 3069	1400	0.533 1936	0.526 7374	1849	0.231 2880	0.228 4872	754
19	0.838 0179	0.842 6686	1369	0.520 2434	0.513 7123	1874	0.225 6700	0.222 8368	766
20	0.847 2588	0.851 7882	1338	0.507 1444	0.500 5401	1899	0.219 9878	0.217 1230	778
21	−0.856 2563	−0.860 6628	+1306	+0.493 9001	+0.487 2248	+1923	+0.214 2425	+0.211 3468	+ 789
22	0.865 0074	0.869 2898	1274	0.480 5147	0.473 7704	1946	0.208 4362	0.205 5108	801
23	0.873 5096	0.877 6665	1241	0.466 9923	0.460 1810	1969	0.202 5707	0.199 6162	812
24	0.881 7602	0.885 7905	1208	0.453 3369	0.446 4606	1991	0.196 6475	0.193 6649	823
25	0.889 7571	0.893 6597	1174	0.439 5526	0.432 6133	2013	0.190 6686	0.187 6587	833
26	−0.897 4980	−0.901 2717	+1139	+0.425 6434	+0.418 6433	+2035	+0.184 6356	+0.181 5994	+ 844
27	0.904 9806	0.908 6246	1104	0.411 6136	0.404 5547	2056	0.178 5504	0.175 4888	854
28	0.912 2034	0.915 7168	1068	0.397 4672	0.390 3515	2077	0.172 4147	0.169 3284	864
29	0.919 1645	0.922 5462	1032	0.383 2082	0.376 0377	2097	0.166 2300	0.163 1199	874
30	0.925 8619	0.929 1113	996	0.368 8406	0.361 6173	2116	0.159 9982	0.156 8651	884
31	−0.932 2940	−0.935 4099	+ 959	+0.354 3682	+0.347 0938	+2135	+0.153 7209	+0.150 5657	+ 893
ept. 1	0.938 4589	0.941 4408	921	0.339 7947	0.332 4713	2153	0.147 3996	0.144 2230	902
2	0.944 3554	0.947 2024	883	0.325 1241	0.317 7536	2171	0.141 0360	0.137 8388	911
3	0.949 9815	0.952 6924	845	0.310 3601	0.302 9441	2188	0.134 6317	0.131 4148	920
4	0.955 3350	0.957 9091	806	0.295 5062	0.288 0468	2204	0.128 1883	0.124 9524	929
5	−0.960 4144	−0.962 8508	+ 767	+0.280 5665	+0.273 0656	+2219	+0.121 7074	+0.118 4535	+ 937
6	0.965 2180	0.967 5156	727	0.265 5447	0.258 0044	2234	0.115 1908	0.111 9196	945
7	0.969 7433	0.971 9010	687	0.250 4451	0.242 8673	2248	0.108 6403	0.105 3529	953
8	0.973 9884	0.976 0054	647	0.235 2715	0.227 6584	2262	0.102 0577	0.098 7550	960
9	0.977 9518	0.979 8274	606	0.220 0285	0.212 3822	2275	0.095 4449	0.092 1276	967
10	−0.981 6320	−0.983 3653	+ 565	+0.204 7201	+0.197 0428	+2287	+0.088 8036	+0.085 4730	+ 974
11	0.985 0271	0.986 6173	524	0.189 3510	0.181 6452	2299	0.082 1361	0.078 7931	981
12	0.988 1357	0.989 5820	482	0.173 9259	0.166 1936	2310	0.075 4442	0.072 0898	987
13	0.990 9561	0.992 2579	440	0.158 4489	0.150 6925	2320	0.068 7300	0.065 3651	993
14	0.993 4873	0.994 6441	398	0.142 9250	0.135 1469	2330	0.061 9954	0.058 6212	999
15	−0.995 7281	−0.996 7392	+ 355	+0.127 3587	+0.119 5612	+2339	+0.055 2427	+0.051 8602	+1004
16	0.997 6774	0.998 5426	312	0.111 7550	0.103 9405	2348	0.048 4739	0.045 0840	1009
17	0.999 3347	1.000 0534	269	0.096 1184	0.088 2894	2355	0.041 6908	0.038 2947	1014
18	1.000 6988	1.001 2709	226	0.080 4540	0.072 6128	2362	0.034 8958	0.031 4944	1019
19	1.001 7695	1.002 1945	182	0.064 7664	0.056 9153	2368	0.028 0909	0.024 6854	1023
20	−1.002 5460	−1.002 8240	+ 138	+0.049 0603	+0.041 2020	+2374	+0.021 2783	+0.017 8698	+1027
21	1.003 0285	1.003 1593	94	0.033 3410	0.025 4779	2379	0.014 4600	0.011 0492	1031
22	1.003 2164	1.003 1999	50	0.017 6132	+0.009 7475	2383	0.007 6379	+0.004 2262	1034
23	1.003 1099	1.002 9463	+ 6	+0.001 8814	−0.005 9845	2387	+0.000 8144	−0.002 5973	1037
24	1.002 7090	1.002 3982	− 39	−0.013 8495	0.021 7130	2390	−0.006 0086	0.009 4194	1040
25	−1.002 0138	−1.001 5560	− 84	−0.029 5746	−0.037 4337	+2392	−0.012 8293	−0.016 2381	+1042
26	1.001 0249	1.000 4205	129	0.045 2896	0.053 1418	2393	0.019 6456	0.023 0515	1044
27	0.999 7430	0.998 9922	174	0.060 9898	0.068 8331	2394	0.026 4555	0.029 8575	1046
28	0.998 1681	0.997 2710	219	0.076 6710	0.084 5030	2394	0.033 2572	0.036 6545	1047
29	0.996 3011	0.995 2582	264	0.092 3287	0.100 1475	2393	0.040 0490	0.043 4406	1049
30	−0.994 1423	−0.992 9534	− 309	−0.107 9588	−0.115 7621	+2392	−0.046 8290	−0.050 2139	+1050
t. 1	*−0.991 6918*	*−0.990 3575*	*− 354*	*−0.123 5569*	−0.131 3427	+2390	−0.053 5952	−0.056 [illegible]	+1050

GREENWICH MEAN TIME.

Date.	X True Equinox. Noon.	X True Equinox. Midnight.	Reduc. to Mean Eq'x of 1917.0. Noon.	Y True Equinox. Noon.	Y True Equinox. Midnight.	Reduc. to Mean Eq'x of 1917.0. Noon.	Z True Equinox. Noon.	Z True Equinox. Midnight.	Red. to Me. Eq'x 1917 Noon.
Oct. 1	−0.991 6918	−0.990 3575	− 354	−0.123 5569	−0.131 3427	+2390	−0.053 5952	−0.056 9727	+1
2	0.988 9505	0.987 4707	400	0.139 1189	0.146 8850	2387	0.060 3460	0.063 7150	1
3	0.985 9184	0.984 2935	445	0.154 6406	0.162 3851	2383	0.067 0794	0.070 4390	1
4	0.982 5960	0.980 8261	491	0.170 1178	0.177 8383	2379	0.073 7936	0.077 1429	1
5	0.978 9839	0.977 0692	537	0.185 5459	0.193 2402	2374	0.080 4866	0.083 8245	1
6	−0.975 0822	−0.973 0228	− 582	−0.200 9206	−0.208 5865	+2368	−0.087 1565	−0.090 4822	+1
7	0.970 8913	0.968 6878	628	0.216 2372	0.223 8722	2362	0.093 8012	0.097 1135	1
8	0.966 4124	0.964 0650	673	0.231 4909	0.239 0928	2355	0.100 4188	0.103 7167	1
9	0.961 6458	0.959 1550	718	0.246 6773	0.254 2438	2347	0.107 0069	0.110 2894	1
10	0.956 5926	0.953 9587	763	0.261 7916	0.269 3202	2339	0.113 5638	0.116 8298	1
11	−0.951 2536	−0.948 4774	− 808	−0.276 8290	−0.284 3174	+2330	−0.120 0872	−0.123 3358	+1
12	0.945 6302	0.942 7121	854	0.291 7848	0.299 2305	2320	0.126 5751	0.129 8050	1
13	0.939 7235	0.936 6644	899	0.306 6540	0.314 0548	2309	0.133 0253	0.136 2357	1
14	0.933 5352	0.930 3359	944	0.321 4322	0.328 7855	2298	0.139 4359	0.142 6256	1
15	0.927 0668	0.923 7280	989	0.336 1143	0.343 4180	2286	0.145 8046	0.148 9728	1
16	−0.920 3198	−0.916 8426	−1034	−0.350 6959	−0.357 9475	+2274	−0.152 1297	−0.155 2751	+1
17	0.913 2965	0.909 6817	1079	0.365 1721	0.372 3691	2261	0.158 4087	0.161 5304	1
18	0.905 9985	0.902 2473	1124	0.379 5380	0.386 6782	2247	0.164 6399	0.167 7370	1
19	0.898 4283	0.894 5417	1169	0.393 7891	0.400 8702	2232	0.170 8212	0.173 8925	
20	0.890 5880	0.886 5673	1213	0.407 9209	0.414 9407	2217	0.176 9506	0.179 9952	
21	−0.882 4800	−0.878 3265	−1257	−0.421 9289	−0.428 8851	+2201	−0.183 0262	−0.186 0434	+
22	0.874 1072	0.869 8223	1301	0.435 8087	0.442 6991	2185	0.189 0464	0.192 0350	
23	0.865 4722	0.861 0573	1345	0.449 5559	0.456 3785	2168	0.195 0089	0.197 9681	
24	0.856 5778	0.852 0340	1389	0.463 1665	0.469 9194	2150	0.200 9122	0.203 8412	
25	0.847 4265	0.842 7556	1432	0.476 6366	0.483 3177	2131	0.206 7548	0.209 6527	
26	−0.838 0215	−0.833 2246	−1475	−0.489 9621	−0.496 5695	+2111	−0.212 5348	−0.215 4007	+
27	0.828 3654	0.823 4441	1518	0.503 1392	0.509 6709	2091	0.218 2504	0.221 0837	
28	0.818 4610	0.813 4166	1561	0.516 1642	0.522 6186	2070	0.223 9003	0.226 7002	
29	0.808 3113	0.803 1452	1603	0.529 0337	0.535 4090	2049	0.229 4830	0.232 2486	
30	0.797 9187	0.792 6322	1645	0.541 7439	0.548 0380	2027	0.234 9967	0.237 7271	
31	−0.787 2862	−0.781 8809	−1687	−0.554 2909	−0.560 5023	+2004	−0.240 4397	−0.243 1344	+
Nov. 1	0.776 4166	0.770 8935	1728	0.566 6716	0.572 7983	1981	0.245 8108	0.248 4688	
2	0.765 3121	0.759 6728	1769	0.578 8820	0.584 9221	1957	0.251 1080	0.253 7283	
3	0.753 9760	0.748 2219	1810	0.590 9182	0.596 8699	1933	0.256 3295	0.258 9115	
4	0.742 4109	0.736 5433	1851	0.602 7767	0.608 6380	1908	0.261 4741	0.264 0169	
5	−0.730 6198	−0.724 6407	−1891	−0.614 4535	−0.620 2226	+1882	−0.266 5398	−0.269 0426	+
6	0.718 6061	0.712 5166	1931	0.625 9449	0.631 6199	1855	0.271 5251	0.273 9869	
7	0.706 3726	0.700 1746	1971	0.637 2470	0.642 8259	1828	0.276 4280	0.278 8482	
8	0.693 9229	0.687 6180	2010	0.648 3560	0.653 8369	1800	0.281 2471	0.283 6246	
9	0.681 2606	0.674 8509	2049	0.659 2681	0.664 6493	1772	0.285 9806	0.288 3149	
10	−0.668 3894	−0.661 8764	−2087	−0.669 9798	−0.675 2592	+1743	−0.290 6271	−0.292 9172	+
11	0.655 3126	0.648 6984	2125	0.680 4871	0.685 6631	1713	0.295 1848	0.297 4299	
12	0.642 0344	0.635 3210	2162	0.690 7866	0.695 8572	1682	0.299 6522	0.301 8515	
13	0.628 5587	0.621 7479	2199	0.700 8745	0.705 8380	1651	0.304 0277	0.306 1805	
14	0.614 8894	0.607 9836	2236	0.710 7473	0.715 6021	1619	0.308 3097	0.310 4153	
15	−0.601 0311	−0.594 0324	−2272	−0.720 4020	−0.725 1464	+1587	−0.312 4971	−0.314 5547	+
16	−0.586 9882	−0.579 8989	−2308	−0.729 8350	−0.734 4673	+1554	−0.316 5880	−0.318 5970	+

GREENWICH MEAN TIME.

Date.	X True Equinox.		Reduc. to Mean Eq'x of 1917.0.	Y True Equinox.		Reduc. to Mean Eq'x of 1917.0.	Z True Equinox.		Reduc. to Mean Eq'x of 1917.0.
	Noon.	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*	*Noon.*	*Midnight.*	*Noon.*
Nov. 16	−0.586 9882	−0.579 8989	−2308	−0.729 8350	−0.734 4673	+1554	−0.316 5880	−0.318 5970	+696
17	0.572 7652	0.565 5875	2343	0.739 0429	0.743 5615	1521	0.320 5814	0.322 5410	680
18	0.558 3665	0.551 1028	2378	0.748 0226	0.752 4261	1487	0.324 4758	0.326 3856	664
19	0.543 7969	0.536 4495	2412	0.756 7717	0.761 0588	1452	0.328 2702	0.330 1294	648
20	0.529 0611	0.521 6325	2445	0.765 2871	0.769 4563	1416	0.331 9631	0.333 7713	632
21	−0.514 1641	−0.506 6566	−2478	−0.773 5662	−0.777 6165	+1380	−0.335 5538	−0.337 3105	+615
22	0.499 1105	0.491 5265	2510	0.781 6068	0.785 5369	1343	0.339 0412	0.340 7458	598
23	0.483 9051	0.476 2469	2542	0.789 4065	0.793 2153	1306	0.342 4242	0.344 0762	581
24	0.468 5526	0.460 8226	2573	0.796 9631	0.800 6495	1268	0.345 7018	0.347 3009	564
25	0.453 0575	0.445 2580	2604	0.804 2742	0.807 8372	1230	0.348 8733	0.350 4189	546
26	−0.437 4246	−0.429 5578	−2634	−0.811 3382	−0.814 7769	+1191	−0.351 9376	−0.353 4294	+528
27	0.421 6583	0.413 7267	2664	0.818 1530	0.821 4664	1152	0.354 8941	0.356 3316	510
28	0.405 7635	0.397 7692	2693	0.824 7169	0.827 9042	1112	0.357 7418	0.359 1245	491
29	0.389 7442	0.381 6892	2721	0.831 0279	0.834 0878	1071	0.360 4797	0.361 8074	472
30	0.373 6049	0.365 4918	2748	0.837 0836	0.840 0153	1030	0.363 1073	0.364 3793	453
Dec. 1	−0.357 3505	−0.349 1816	−2775	−0.842 8826	−0.845 6851	+ 983	−0.365 6233	−0.366 8392	+434
2	0.340 9854	0.332 7626	2801	0.848 4226	0.851 0949	946	0.368 0269	0.369 1863	415
3	0.324 5140	0.316 2402	2826	0.853 7018	0.856 2430	903	0.370 3173	0.371 4199	395
4	0.307 9416	0.299 6188	2851	0.858 7183	0.861 1273	860	0.372 4938	0.373 5389	375
5	0.291 2725	0.282 9034	2875	0.863 4699	0.865 7460	816	0.374 5552	0.375 5426	355
6	−0.274 5122	−0.266 0994	−2898	−0.867 9552	−0.870 0974	+ 771	−0.376 5010	−0.377 4302	+335
7	0.257 6656	0.249 2114	2921	0.872 1723	0.874 1796	726	0.378 3302	0.379 2009	315
8	0.240 7376	0.232 2448	2942	0.876 1193	0.877 9911	681	0.380 0422	0.380 8541	294
9	0.223 7336	0.215 2047	2963	0.879 7949	0.881 5305	635	0.381 6364	0.382 3890	273
10	0.206 6588	0.198 0965	2983	0.883 1976	0.884 7961	589	0.383 1119	0.383 8051	252
11	−0.189 5186	−0.180 9257	−3002	−0.886 3258	−0.887 7864	+ 542	−0.384 4684	−0.385 1017	+231
12	0.172 3185	0.163 6977	3020	0.889 1779	0.890 5002	495	0.385 7050	0.386 2783	210
13	0.155 0640	0.146 4181	3037	0.891 7531	0.892 9365	447	0.386 8214	0.387 3343	188
14	0.137 7608	0.129 0928	3053	0.894 0503	0.895 0944	399	0.387 8170	0.388 2694	166
15	0.120 4148	0.111 7274	3069	0.896 0687	0.896 9729	350	0.388 6915	0.389 0833	144
16	−0.103 0314	−0.094 3277	−3084	−0.897 8070	−0.898 5710	+ 301	−0.389 4448	−0.389 7758	+122
17	0.085 6168	0.076 8995	3098	0.899 2648	0.899 8884	252	0.390 0764	0.390 3467	100
18	0.068 1766	0.059 4488	3111	0.900 4419	0.900 9252	202	0.390 5865	0.390 7958	78
19	0.050 7167	0.041 9810	3123	0.901 3383	0.901 6811	152	0.390 9747	0.391 1232	55
20	0.033 2425	0.024 5018	3134	0.901 9536	0.902 1560	101	0.391 2413	0.391 3290	33
21	−0.015 7597	−0.007 0168	−3144	−0.902 2882	−0.902 3504	+ 50	−0.391 3863	−0.391 4133	+ 10
22	+0.001 7263	+0.010 4688	3153	0.902 3424	0.902 2643	− 1	0.391 4099	0.391 3761	− 12
23	0.019 2101	0.027 9495	3161	0.902 1162	0.901 8983	52	0.391 3119	0.391 2175	35
24	0.036 6864	0.045 4202	3168	0.901 6104	0.901 2525	104	0.391 0928	0.390 9378	58
25	0.054 1501	0.062 8756	3174	0.900 8249	0.900 3274	156	0.390 7525	0.390 5370	81
26	+0.071 5960	+0.080 3106	−3179	−0.899 7602	−0.899 1234	− 208	−0.390 2913	−0.390 0154	−104
27	0.089 0189	0.097 7203	3183	0.898 4170	0.897 6410	260	0.389 7093	0.389 3730	127
28	0.106 4141	0.115 0997	3186	0.896 7956	0.895 8809	313	0.389 0065	0.388 6100	150
29	0.123 7764	0.132 4436	3188	0.894 8969	0.893 8434	366	0.388 1835	0.387 7269	173
30	0.141 1006	0.149 7469	3190	0.892 7205	0.891 5286	419	0.387 2403	0.386 7236	196
31	+0.158 3817	+0.167 0045	*−3189*	*−0.890 2678*	−0.888 9379	− 472	−0.386 1769	−0.385 6002	−220
32	*+0.175 6146*	*+0.184 2114*	*−3188*	*−0.887 5389*	−0.886 0710	− 526	−0.384 9935	−0.384 3570	−[illegible]

MEAN TIME.

MEAN TIME.

MEAN TIME.

MEAN TIME.

MEAN TIME.

MEAN TIME.

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
	JANUARY 25.			
	h m s	s	° ′ ″	″
0	22 24 50.95	2.2698	−5 50 35.2	+15.842
1	22 27 7.01	2.2656	5 34 44.1	15.860
2	22 29 22.82	2.2614	5 18 52.0	15.877
3	22 31 38.38	2.2574	5 2 58.9	15.892
4	22 33 53.71	2.2534	4 47 5.0	15.905
5	22 36 8.79	2.2495	4 31 10.3	15.917
6	22 38 23.65	2.2458	4 15 15.0	15.925
7	22 40 38.28	2.2419	3 59 19.3	15.933
8	22 42 52.68	2.2383	3 43 23.1	15.938
9	22 45 6.87	2.2347	3 27 26.7	15.942
10	22 47 20.84	2.2310	3 11 30.1	15.944
11	22 49 34.59	2.2276	2 55 33.4	15.945
12	22 51 48.15	2.2243	2 39 36.7	15.943
13	22 54 1.50	2.2209	2 23 40.2	15.940
14	22 56 14.66	2.2177	2 7 43.9	15.935
15	22 58 27.62	2.2144	1 51 48.0	15.928
16	23 0 40.39	2.2113	1 35 52.6	15.920
17	23 2 52.98	2.2083	1 19 57.6	15.910
18	23 5 5.39	2.2054	1 4 3.4	15.898
19	23 7 17.63	2.2025	0 48 9.8	15.886
20	23 9 29.69	2.1997	0 32 17.1	15.870
21	23 11 41.59	2.1969	0 16 25.4	15.853
22	23 13 53.32	2.1943	−0 0 34.7	15.836
23	23 16 4.90	2.1917	+0 15 14.9	+15.816
	JANUARY 26.			
0	23 18 16.32	2.1891	+0 31 3.2	+15.794
1	23 20 27.59	2.1867	0 46 50.2	15.772
2	23 22 38.72	2.1844	1 2 35.8	15.747
3	23 24 49.72	2.1821	1 18 19.8	15.721
4	23 27 0.57	2.1798	1 34 2.3	15.693
5	23 29 11.29	2.1777	1 49 43.0	15.664
6	23 31 21.89	2.1757	2 5 22.0	15.634
7	23 33 32.37	2.1737	2 20 59.1	15.603
8	23 35 42.73	2.1718	2 36 34.3	15.569
9	23 37 52.98	2.1698	2 52 7.4	15.534
10	23 40 3.11	2.1680	3 7 38.4	15.498
11	23 42 13.14	2.1663	3 23 7.1	15.459
12	23 44 23.07	2.1648	3 38 33.5	15.421
13	23 46 32.91	2.1632	3 53 57.6	15.380
14	23 48 42.65	2.1617	4 9 19.1	15.338
15	23 50 52.31	2.1603	4 24 38.2	15.296
16	23 53 1.88	2.1588	4 39 54.6	15.251
17	23 55 11.37	2.1576	4 55 8.3	15.205
18	23 57 20.79	2.1564	5 10 19.2	15.158
19	23 59 30.14	2.1553	5 25 27.2	15.109
20	0 1 39.42	2.1542	5 40 32.3	15.059
21	0 3 48.64	2.1532	5 55 34.3	15.008
22	0 5 57.80	2.1523	6 10 33.3	14.957
23	0 8 6.91	2.1513	6 25 29.1	14.903
24	0 10 15.96	2.1505	+6 40 21.6	+14.848

Hour.	Right Ascension.	Var. per Min.	Declination.
	JANUARY 27.		
	h m s	s	° ′ ″
0	0 10 15.96	2.1505	+ 6 40 21.6
1	0 12 24.97	2.1498	6 55 10.8
2	0 14 33.93	2.1491	7 9 56.6
3	0 16 42.86	2.1485	7 24 39.0
4	0 18 51.75	2.1479	7 39 17.8
5	0 21 0.61	2.1474	7 53 53.0
6	0 23 9.44	2.1470	8 8 24.5
7	0 25 18.25	2.1467	8 22 52.3
8	0 27 27.04	2.1463	8 37 16.2
9	0 29 35.81	2.1460	8 51 36.3
10	0 31 44.56	2.1458	9 5 52.4
11	0 33 53.31	2.1458	9 20 4.4
12	0 36 2.05	2.1457	9 34 12.4
13	0 38 10.79	2.1458	9 48 16.2
14	0 40 19.54	2.1458	10 2 15.8
15	0 42 28.28	2.1458	10 16 11.1
16	0 44 37.04	2.1461	10 30 2.1
17	0 46 45.81	2.1463	10 43 48.7
18	0 48 54.59	2.1465	10 57 30.8
19	0 51 3.39	2.1468	11 11 8.3
20	0 53 12.21	2.1472	11 24 41.3
21	0 55 21.05	2.1476	11 38 9.6
22	0 57 29.92	2.1481	11 51 33.3
23	0 59 38.82	2.1486	+12 4 52.1
	JANUARY 28.		
0	1 1 47.75	2.1492	+12 18 6.2
1	1 3 56.72	2.1498	12 31 15.3
2	1 6 5.72	2.1504	12 44 19.5
3	1 8 14.77	2.1512	12 57 18.7
4	1 10 23.86	2.1519	13 10 12.9
5	1 12 33.00	2.1528	13 23 1.9
6	1 14 42.19	2.1535	13 35 45.8
7	1 16 51.42	2.1544	13 48 24.5
8	1 19 0.72	2.1554	14 0 57.9
9	1 21 10.07	2.1563	14 13 25.9
10	1 23 19.48	2.1573	14 25 48.6
11	1 25 28.94	2.1583	14 38 5.9
12	1 27 38.48	2.1595	14 50 17.7
13	1 29 48.08	2.1606	15 2 23.9
14	1 31 57.75	2.1617	15 14 24.6
15	1 34 7.48	2.1628	15 26 19.6
16	1 36 17.29	2.1642	15 38 9.0
17	1 38 27.18	2.1653	15 49 52.6
18	1 40 37.13	2.1666	16 1 30.5
19	1 42 47.17	2.1680	16 13 2.5
20	1 44 57.29	2.1693	16 24 28.6
21	1 47 7.48	2.1706	16 35 48.8
22	1 49 17.76	2.1720	16 47 3.1
23	1 51 28.12	2.1733	16 58 11.3
24	1 53 38.56	2.1748	+17 9 13.5

MEAN TIME.

MEAN TIME.

MEAN TIME.

MEAN TIME.

GREENWICH MEAN TIME.

FEBRUARY 14.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
	h m s	s	° ′ ″	″
0	14 57 28.45	2.2733	−21 37 29.4	−7.942
1	14 59 45.05	2.2801	21 45 22.7	7.834
2	15 2 2.06	2.2868	21 53 9.5	7.725
3	15 4 19.47	2.2935	22 0 49.7	7.614
4	15 6 37.28	2.3003	22 8 23.2	7.503
5	15 8 55.50	2.3070	22 15 50.0	7.390
6	15 11 14.12	2.3137	22 23 10.0	7.276
7	15 13 33.14	2.3203	22 30 23.1	7.160
8	15 15 52.56	2.3271	22 37 29.2	7.043
9	15 18 12.39	2.3338	22 44 28.3	6.925
10	15 20 32.62	2.3405	22 51 20.2	6.805
11	15 22 53.25	2.3472	22 58 4.9	6.684
12	15 25 14.28	2.3538	23 4 42.3	6.562
13	15 27 35.71	2.3605	23 11 12.3	6.438
14	15 29 57.54	2.3671	23 17 34.9	6.314
15	15 32 19.76	2.3737	23 23 50.0	6.188
16	15 34 42.38	2.3802	23 29 57.4	6.059
17	15 37 5.38	2.3867	23 35 57.1	5.930
18	15 39 28.78	2.3933	23 41 49.0	5.801
19	15 41 52.57	2.3997	23 47 33.2	5.669
20	15 44 16.74	2.4061	23 53 9.3	5.536
21	15 46 41.30	2.4124	23 58 37.5	5.403
22	15 49 6.23	2.4188	24 3 57.6	5.268
23	15 51 31.55	2.4251	−24 9 9.6	−5.130

FEBRUARY 15.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
0	15 53 57.24	2.4313	−24 14 13.2	−4.992
1	15 56 23.30	2.4375	24 19 8.6	4.853
2	15 58 49.74	2.4437	24 23 55.6	4.713
3	16 1 16.54	2.4497	24 28 34.1	4.570
4	16 3 43.70	2.4557	24 33 4.0	4.428
5	16 6 11.22	2.4616	24 37 25.4	4.284
6	16 8 39.09	2.4675	24 41 38.1	4.138
7	16 11 7.32	2.4734	24 45 42.0	3.992
8	16 13 35.90	2.4791	24 49 37.1	3.844
9	16 16 4.81	2.4848	24 53 23.3	3.695
10	16 18 34.07	2.4904	24 57 0.5	3.545
11	16 21 3.66	2.4959	25 0 28.7	3.393
12	16 23 33.58	2.5014	25 3 47.7	3.241
13	16 26 3.83	2.5068	25 6 57.6	3.088
14	16 28 34.39	2.5120	25 9 58.3	2.933
15	16 31 5.27	2.5172	25 12 49.6	2.778
16	16 33 36.45	2.5223	25 15 31.6	2.622
17	16 36 7.95	2.5273	25 18 4.2	2.463
18	16 38 39.73	2.5322	25 20 27.2	2.304
19	16 41 11.81	2.5371	25 22 40.7	2.145
20	16 43 44.18	2.5418	25 24 44.6	1.984
21	16 46 16.82	2.5463	25 26 38.8	1.823
22	16 48 49.74	2.5509	25 28 23.3	1.659
23	16 51 22.93	2.5553	25 29 57.9	1.495
24	*16 53 56.38*	*2.5597*	*−25 31 22.7*	*−1.331*

FEBRUARY 16.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
	h m s	s	° ′ ″	″
0	16 53 56.38	2.5597	−25 31 22.7	−1.331
1	16 56 30.09	2.5638	25 32 37.6	1.166
2	16 59 4.04	2.5679	25 33 42.6	1.000
3	17 1 38.24	2.5718	25 34 37.6	0.833
4	17 4 12.66	2.5757	25 35 22.6	0.665
5	17 6 47.32	2.5795	25 35 57.4	0.497
6	17 9 22.20	2.5831	25 36 22.2	0.328
7	17 11 57.29	2.5865	25 36 36.7	−0.157
8	17 14 32.58	2.5899	25 36 41.0	+0.013
9	17 17 8.08	2.5932	25 36 35.1	0.184
10	17 19 43.76	2.5963	25 36 18.9	0.357
11	17 22 19.63	2.5993	25 35 52.3	0.530
12	17 24 55.68	2.6023	25 35 15.3	0.703
13	17 27 31.90	2.6049	25 34 27.9	0.876
14	17 30 8.27	2.6075	25 33 30.2	1.050
15	17 32 44.80	2.6100	25 32 21.9	1.226
16	17 35 21.47	2.6123	25 31 3.1	1.400
17	17 37 58.28	2.6146	25 29 33.9	1.575
18	17 40 35.22	2.6166	25 27 54.1	1.752
19	17 43 12.27	2.6185	25 26 3.7	1.928
20	17 45 49.44	2.6203	25 24 2.8	2.104
21	17 48 26.71	2.6221	25 21 51.2	2.281
22	17 51 4.09	2.6236	25 19 29.1	2.457
23	17 53 41.54	2.6249	−25 16 56.4	+2.634

FEBRUARY 17.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
0	17 56 19.08	2.6263	−25 14 13.0	+2.812
1	17 58 56.69	2.6274	25 11 19.0	2.989
2	18 1 34.37	2.6283	25 8 14.3	3.168
3	18 4 12.09	2.6292	25 4 58.9	3.345
4	18 6 49.87	2.6300	25 1 32.9	3.522
5	18 9 27.69	2.6305	24 57 56.3	3.699
6	18 12 5.53	2.6309	24 54 9.0	3.878
7	18 14 43.40	2.6313	24 50 11.0	4.055
8	18 17 21.29	2.6315	24 46 2.4	4.232
9	18 19 59.18	2.6315	24 41 43.2	4.409
10	18 22 37.07	2.6314	24 37 13.3	4.586
11	18 25 14.95	2.6313	24 32 32.9	4.763
12	18 27 52.82	2.6309	24 27 41.8	4.939
13	18 30 30.66	2.6304	24 22 40.2	5.115
14	18 33 8.47	2.6298	24 17 28.0	5.292
15	18 35 46.23	2.6290	24 12 5.2	5.467
16	18 38 23.95	2.6283	24 6 32.0	5.641
17	18 41 1.62	2.6273	24 0 48.3	5.816
18	18 43 39.22	2.6260	23 54 54.1	5.989
19	18 46 16.74	2.6248	23 48 49.6	6.163
20	18 48 54.20	2.6235	23 42 34.6	6.336
21	18 51 31.56	2.6220	23 36 9.3	6.508
22	18 54 8.84	2.6204	23 29 33.7	6.678
23	18 56 46.01	2.6187	23 22 47.9	6.849
24	18 59 23.08	2.6168	−23 15 51.8	+7.020

MEAN TIME.

MEAN TIME.

MEAN TIME.

MEAN TIME.

Var. per Min.
″
– 7.925
8.012
8.098
8.183
8.267
8.350
8.433
8.516
8.597
8.678
8.758
8.836
8.914
8.993
9.070
9.146
9.221
9.296
9.370
9.443
9.515
9.588
9.658
– 9.728
– 9.798
9.867
9.935
10.003
10.069
10.134
10.199
10.264
10.328
10.391
10.453
10.514
10.575
10.635
10.694
10.753
10.811
10.868
10.923
10.979
11.034
11.088
11.141
11.19[illegible]
– 11.2[illegible]

MEAN TIME.

11	10 26 24.94	1.8215	5 43 6.9	12.603	11	11 54 8.28	1.8555	4 37 42.7
12	10 28 14.21	1.8208	5 30 30 0	12.628	12	11 55 59.67	1.8576	4 50 40.1
13	10 30 3.44	1.8203	5 17 51.5	12 .653	13	11 57 51.19	1.8598	5 3 36.8
14	10 31 52.65	1.8198	5 5 11.6	12.677	14	11 59 42.85	1.8621	5 16 32.6
15	10 33 41.82	1.8193	4 52 30.3	12.701	15	12 1 34.64	1.8644	5 29 27.6
16	10 35 30.97	1.8190	4 39 47.5	12.724	16	12 3 26.58	1.8668	5 42 21.7
17	10 37 20.10	1.8187	4 27 3.4	12.745	17	12 5 18.65	1.8692	5 55 14.8
18	10 39 9.21	1.8183	4 14 18.1	12.766	18	12 7 10.88	1.8717	6 8 6.9
19	10 40 58.30	1 8182	4 1 31.5	12 787	19	12 9 3.25	1.8742	6 20 57.9
20	10 42 47.39	1.8180	3 48 43.7	12 807	20	12 10 55 78	1.8768	6 33 47.8
21	10 44 36.46	1.8178	3 35 54 7	12.825	21	12 12 48.47	1 8794	6 46 36.5
22	10 46 25.53	1.8178	3 23 4 7	12.843	22	12 14 41.31	1.8822	6 59 24.0
23	10 48 14.60	1.8178	3 10 13.6	12 860	23	12 16 34.33	1.8850	7 12 10.2
24	10 50 3.67	1.8178	+ 2 57 21.5	−12.877	24	12 18 27.51	1.8878	−7 24 55.0

MEAN TIME.

MEAN TIME.

MEAN TIME.

MEAN TIME.

MEAN TIME.

MEAN TIME.

MEAN TIME.

MEAN TIME.

MEAN TIME.

MEAN TIME.

MEAN TIME.

MEAN TIME.

MEAN TIME.

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
	MAY 1.			
	h m s	s	° ′ ″	″
0	10 22 33.01	1.8201	+5 49 16.7	−12.327
1	10 24 22.20	1.8195	5 36 56.3	12.354
2	10 26 11.35	1.8190	5 24 34.2	12.380
3	10 28 0.48	1.8187	5 12 10.7	12.405
4	10 29 49.59	1.8183	4 59 45.6	12.430
5	10 31 38.68	1.8180	4 47 19.1	12.454
6	10 33 27.75	1.8178	4 34 51.1	12.478
7	10 35 16.81	1.8177	4 22 21.8	12.500
8	10 37 5.87	1.8176	4 9 51.1	12.523
9	10 38 54.92	1.8175	3 57 19.1	12.543
10	10 40 43.97	1.8176	3 44 45.9	12.564
11	10 42 33.03	1.8178	3 32 11.4	12.585
12	10 44 22.10	1.8179	3 19 35.7	12.604
13	10 46 11.18	1.8182	3 6 58.9	12.623
14	10 48 0.28	1.8186	2 54 20.9	12.642
15	10 49 49.41	1.8189	2 41 41.9	12.658
16	10 51 38.55	1.8193	2 29 1.9	12.676
17	10 53 27.73	1.8198	2 16 20.8	12.693
18	10 55 16.93	1.8204	2 3 38.8	12.708
19	10 57 6.18	1.8211	1 50 55.9	12.723
20	10 58 55.46	1.8218	1 38 12.1	12.737
21	11 0 44.79	1.8226	1 25 27.5	12.750
22	11 2 34.17	1.8234	1 12 42.1	12.763
23	11 4 23.60	1.8243	+0 59 55.9	−12.775
	MAY 2.			
0	11 6 13.08	1.8253	+0 47 9.1	−12.786
1	11 8 2.63	1.8263	0 34 21.6	12.798
2	11 9 52.24	1.8274	0 21 33.4	12.808
3	11 11 41.92	1.8286	+0 8 44.7	12.817
4	11 13 31.67	1.8298	−0 4 4.6	12.826
5	11 15 21.50	1.8312	0 16 54.4	12.834
6	11 17 11.41	1.8326	0 29 44.7	12.841
7	11 19 1.41	1.8340	0 42 35.3	12.847
8	11 20 51.49	1.8354	0 55 26.3	12.853
9	11 22 41.66	1.8371	1 8 17.7	12.858
10	11 24 31.94	1.8388	1 21 9.3	12.863
11	11 26 22.31	1.8404	1 34 1.2	12.866
12	11 28 12.79	1.8423	1 46 53.2	12.868
13	11 30 3.38	1.8440	1 59 45.4	12.870
14	11 31 54.07	1.8459	2 12 37.6	12.872
15	11 33 44.89	1.8480	2 25 30.0	12.873
16	11 35 35.83	1.8500	2 38 22.3	12.872
17	11 37 26.89	1.8521	2 51 14.6	12.872
18	11 39 18.08	1.8543	3 4 6.9	12.869
19	11 41 9.40	1.8565	3 16 58.9	12.866
20	11 43 0.86	1.8588	3 29 50.8	12.863
21	11 44 52.45	1.8612	3 42 42.5	12.860
22	11 46 44.20	1.8637	3 55 34.0	12.855
23	11 48 36.09	1.8661	4 8 25.1	12.848
24	11 50 28.13	1.8687	−4 21 15.8	−12.842

Hour.	Right Ascension.	Var. per Min.	Declinatio
	MAY 3.		
	h m s	s	° ′
0	11 50 28.13	1.8687	− 4 21 15
1	11 52 20.33	1.8713	4 34 6
2	11 54 12.69	1.8741	4 46 55
3	11 56 5.22	1.8769	4 59 45
4	11 57 57.92	1.8797	5 12 34
5	11 59 50.78	1.8826	5 25 22
6	12 1 43.83	1.8856	5 38 9
7	12 3 37.05	1.8886	5 50 56
8	12 5 30.46	1.8918	6 3 42
9	12 7 24.06	1.8949	6 16 27
10	12 9 17.85	1.8981	6 29 11
11	12 11 11.83	1.9014	6 41 54.
12	12 13 6.02	1.9048	6 54 37.
13	12 15 0.41	1.9083	7 7 18.
14	12 16 55.01	1.9118	7 19 58.
15	12 18 49.82	1.9153	7 32 37.
16	12 20 44.84	1.9189	7 45 15.
17	12 22 40.09	1.9227	7 57 52.
18	12 24 35.56	1.9263	8 10 27.
19	12 26 31.25	1.9302	8 23 1.
20	12 28 27.18	1.9340	8 35 33.
21	12 30 23.33	1.9379	8 48 4.
22	12 32 19.73	1.9420	9 0 33.
23	12 34 16.37	1.9460	− 9 13 1.
	MAY 4.		
0	12 36 13.25	1.9501	− 9 25 27
1	12 38 10.38	1.9543	9 37 51
2	12 40 7.77	1.9587	9 50 14
3	12 42 5.42	1.9629	10 2 35
4	12 44 3.32	1.9673	10 14 53
5	12 46 1.49	1.9717	10 27 10
6	12 47 59.92	1.9762	10 39 25
7	12 49 58.63	1.9808	10 51 37
8	12 51 57.61	1.9853	11 3 48
9	12 53 56.86	1.9899	11 15 56
10	12 55 56.40	1.9947	11 28 1
11	12 57 56.22	1.9994	11 40 5
12	12 59 56.33	2.0043	11 52 6
13	13 1 56.73	2.0092	12 4 4
14	13 3 57.43	2.0141	12 16 0
15	13 5 58.42	2.0190	12 27 54
16	13 7 59.71	2.0241	12 39 44
17	13 10 1.31	2.0292	12 51 32
18	13 12 3.21	2.0343	13 3 17
19	13 14 5.43	2.0396	13 14 59
20	13 16 7.96	2.0448	13 26 38
21	13 18 10.80	2.0501	13 38 14
22	13 20 13.97	2.0554	13 49 46
23	13 22 17.45	2.0608	14 1 16
24	13 24 21.26	2.0663	−14 12 42

MEAN TIME.

MEAN TIME.

MEAN TIME.

MEAN TIME.

MEAN TIME.

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
	MAY 25.			
	h m s	s	° ′ ″	″
0	7 49 27.38	2.0609	+19 44 40.6	− 8.110
1	7 51 30.89	2.0562	19 36 31.5	8.193
2	7 53 34.12	2.0514	19 28 17.4	8.275
3	7 55 37.06	2.0466	19 19 58.5	8.356
4	7 57 39.71	2.0418	19 11 34.7	8.437
5	7 59 42.08	2.0372	19 3 6.1	8.516
6	8 1 44.17	2.0325	18 54 32.8	8.595
7	8 3 45.98	2.0278	18 45 54.7	8.673
8	8 5 47.51	2.0232	18 37 12.1	8.748
9	8 7 48.76	2.0185	18 28 24.9	8.824
10	8 9 49.73	2.0139	18 19 33.2	8.900
11	8 11 50.43	2.0094	18 10 36.9	8.974
12	8 13 50.86	2.0049	18 1 36.3	9.047
13	8 15 51.02	2.0004	17 52 31.3	9.119
14	8 17 50.91	1.9959	17 43 22.0	9.190
15	8 19 50.53	1.9915	17 34 8.5	9.261
16	8 21 49.89	1.9872	17 24 50.7	9.332
17	8 23 48.99	1.9828	17 15 28.7	9.400
18	8 25 47.83	1.9785	17 6 2.7	9.468
19	8 27 46.41	1.9743	16 56 32.6	9.535
20	8 29 44.74	1.9701	16 46 58.5	9.602
21	8 31 42.82	1.9658	16 37 20.4	9.668
22	8 33 40.64	1.9616	16 27 38.4	9.732
23	8 35 38.21	1.9575	+16 17 52.6	− 9.796
	MAY 26.			
0	8 37 35.54	1.9535	+16 8 2.9	− 9.859
1	8 39 32.63	1.9494	15 58 9.5	9.921
2	8 41 29.47	1.9454	15 48 12.4	9.983
3	8 43 26.08	1.9415	15 38 11.6	10.044
4	8 45 22.45	1.9376	15 28 7.1	10.104
5	8 47 18.59	1.9338	15 17 59.1	10.163
6	8 49 14.50	1.9299	15 7 47.6	10.221
7	8 51 10.18	1.9262	14 57 32.6	10.278
8	8 53 5.64	1.9225	14 47 14.2	10.335
9	8 55 0.88	1.9188	14 36 52.4	10.392
10	8 56 55.90	1.9152	14 26 27.2	10.447
11	8 58 50.70	1.9117	14 15 58.8	10.501
12	9 0 45.30	1.9082	14 5 27.1	10.555
13	9 2 39.68	1.9047	13 54 52.2	10.608
14	9 4 33.86	1.9013	13 44 14.2	10.660
15	9 6 27.83	1.8979	13 33 33.0	10.712
16	9 8 21.61	1.8947	13 22 48.8	10.763
17	9 10 15.19	1.8913	13 12 1.5	10.813
18	9 12 8.57	1.8881	13 1 11.3	10.862
19	9 14 1.76	1.8850	12 50 18.1	10.911
20	9 15 54.77	1.8820	12 39 22.0	10.958
21	9 17 47.60	1.8789	12 28 23.1	11.005
22	9 19 40.24	1.8759	12 17 21.4	11.052
23	9 21 32.71	1.8730	12 6 16.9	11.098
24	9 23 25.00	1.8701	+11 55 9.7	−11.143

Hour.	Right Ascension.	Var. per Min.	Declination.
	MAY 27.		
	h m s	s	° ′ ″
0	9 23 25.00	1.8701	+11 55 9.7
1	9 25 17.12	1.8673	11 43 59.8
2	9 27 9.08	1.8646	11 32 47.3
3	9 29 0.87	1.8619	11 21 32.2
4	9 30 52.51	1.8593	11 10 14.5
5	9 32 43.99	1.8567	10 58 54.3
6	9 34 35.31	1.8542	10 47 31.6
7	9 36 26.49	1.8518	10 36 6.5
8	9 38 17.52	1.8493	10 24 39.0
9	9 40 8.41	1.8470	10 13 9.1
10	9 41 59.16	1.8448	10 1 36.9
11	9 43 49.78	1.8426	9 50 2.5
12	9 45 40.27	1.8404	9 38 25.8
13	9 47 30.63	1.8383	9 26 46.9
14	9 49 20.87	1.8363	9 15 5.9
15	9 51 10.99	1.8343	9 3 22.7
16	9 53 0.99	1.8323	8 51 37.4
17	9 54 50.87	1.8305	8 39 50.1
18	9 56 40.65	1.8288	8 28 0.8
19	9 58 30.33	1.8270	8 16 9.5
20	10 0 19.89	1.8253	8 4 16.3
21	10 2 9.37	1.8238	7 52 21.2
22	10 3 58.75	1.8223	7 40 24.2
23	10 5 48.05	1.8209	+ 7 28 25.4
	MAY 28.		
0	10 7 37.26	1.8195	+ 7 16 24.9
1	10 9 26.39	1.8182	7 4 22.6
2	10 11 15.44	1.8168	6 52 18.7
3	10 13 4.41	1.8157	6 40 13.0
4	10 14 53.32	1.8146	6 28 5.8
5	10 16 42.16	1.8135	6 15 56.9
6	10 18 30.94	1.8125	6 3 46.5
7	10 20 19.66	1.8116	5 51 34.6
8	10 22 8.33	1.8108	5 39 21.1
9	10 23 56.95	1.8099	5 27 6.3
10	10 25 45.52	1.8092	5 14 50.0
11	10 27 34.05	1.8085	5 2 32.4
12	10 29 22.54	1.8079	4 50 13.4
13	10 31 11.00	1.8073	4 37 53.2
14	10 32 59.42	1.8069	4 25 31.6
15	10 34 47.83	1.8066	4 13 8.9
16	10 36 36.21	1.8062	4 0 45.0
17	10 38 24.57	1.8059	3 48 19.9
18	10 40 12.92	1.8058	3 35 53.7
19	10 42 1.26	1.8056	3 23 26.4
20	10 43 49.59	1.8055	3 10 58.1
21	10 45 37.92	1.8056	2 58 28.8
22	10 47 26.26	1.8057	2 45 58.5
23	10 49 14.60	1.8058	2 33 27.3
24	10 51 2.96	1.8061	+ 2 20 55.2

MEAN TIME.

MEAN TIME.

MEAN TIME.

GREENWICH MEAN TIME.

JUNE 10.

Hour.	Right Ascension. h m s	Var. per Min. s	Declination. ° ′ ″	Var. per Min. ″
0	21 45 37.71	2.2327	−9 35 5.2	+14.114
1	21 47 51.55	2.2287	9 20 56.9	14.162
2	21 50 5.15	2.2248	9 6 45.8	14.208
3	21 52 18.52	2.2209	8 52 32.0	14.252
4	21 54 31.66	2.2172	8 38 15.6	14.294
5	21 56 44.58	2.2135	8 23 56.7	14.336
6	21 58 57.28	2.2098	8 9 35.3	14.376
7	22 1 9.76	2.2063	7 55 11.6	14.413
8	22 3 22.03	2.2028	7 40 45.7	14.449
9	22 5 34.09	2.1993	7 26 17.7	14.484
10	22 7 45.95	2.1959	7 11 47.6	14.518
11	22 9 57.60	2.1926	6 57 15.5	14.550
12	22 12 9.06	2.1894	6 42 41.6	14.580
13	22 14 20.33	2.1863	6 28 5.9	14.609
14	22 16 31.42	2.1833	6 13 28.5	14.637
15	22 18 42.32	2.1802	5 58 49.5	14.663
16	22 20 53.04	2.1772	5 44 8.9	14.688
17	22 23 3.58	2.1743	5 29 26.9	14.711
18	22 25 13.96	2.1716	5 14 43.6	14.732
19	22 27 24.17	2.1688	4 59 59.1	14.753
20	22 29 34.22	2.1661	4 45 13.3	14.772
21	22 31 44.10	2.1635	4 30 26.5	14.788
22	22 33 53.84	2.1611	4 15 38.7	14.805
23	22 36 3.43	2.1585	−4 0 49.9	+14.819

JUNE 11.

Hour.	Right Ascension. h m s	Var. per Min. s	Declination. ° ′ ″	Var. per Min. ″
0	22 38 12.86	2.1561	−3 46 0.4	+14.832
1	22 40 22.16	2.1539	3 31 10.1	14.843
2	22 42 31.33	2.1518	3 16 19.2	14.853
3	22 44 40.37	2.1496	3 1 27.7	14.863
4	22 46 49.28	2.1475	2 46 35.7	14.871
5	22 48 58.07	2.1455	2 31 43.2	14.877
6	22 51 6.74	2.1436	2 16 50.5	14.881
7	22 53 15.30	2.1418	2 1 57.5	14.885
8	22 55 23.75	2.1399	1 47 4.3	14.887
9	22 57 32.09	2.1383	1 32 11.1	14.887
10	22 59 40.34	2.1367	1 17 17.9	14.887
11	23 1 48.49	2.1351	1 2 24.7	14.885
12	23 3 56.55	2.1337	0 47 31.7	14.881
13	23 6 4.53	2.1323	0 32 39.0	14.877
14	23 8 12.42	2.1309	0 17 46.5	14.871
15	23 10 20.24	2.1297	−0 2 54.5	14.863
16	23 12 27.98	2.1285	+0 11 57.0	14.854
17	23 14 35.66	2.1274	0 26 48.0	14.844
18	23 16 43.27	2.1264	0 41 38.3	14.833
19	23 18 50.83	2.1254	0 56 28.0	14.821
20	23 20 58.32	2.1245	1 11 16.8	14.806
21	23 23 5.77	2.1238	1 26 4.7	14.791
22	23 25 13.18	2.1231	1 40 51.7	14.775
23	23 27 20.54	2.1224	1 55 37.7	14.758
24	*23 29 27.87*	*2.1219*	+2 10 22.6	+14.738

JUNE 12.

Hour.	Right Ascension. h m s	Var. per Min. s	Declination. ° ′ ″
0	23 29 27.87	2.1219	+ 2 10 22.6
1	23 31 35.17	2.1213	2 25 6.3
2	23 33 42.43	2.1209	2 39 48.7
3	23 35 49.68	2.1206	2 54 29.8
4	23 37 56.90	2.1203	3 9 9.4
5	23 40 4.11	2.1201	3 23 47.6
6	23 42 11.31	2.1199	3 38 24.2
7	23 44 18.50	2.1198	3 52 59.2
8	23 46 25.69	2.1199	4 7 32.5
9	23 48 32.89	2.1200	4 22 4.0
10	23 50 40.09	2.1201	4 36 33.6
11	23 52 47.30	2.1203	4 51 1.4
12	23 54 54.52	2.1206	5 5 27.0
13	23 57 1.77	2.1210	5 19 50.6
14	23 59 9.04	2.1213	5 34 12.1
15	0 1 16.33	2.1218	5 48 31.3
16	0 3 23.66	2.1225	6 2 48.2
17	0 5 31.03	2.1231	6 17 2.8
18	0 7 38.43	2.1237	6 31 14.9
19	0 9 45.87	2.1245	6 45 24.5
20	0 11 53.37	2.1253	6 59 31.6
21	0 14 0.91	2.1263	7 13 35.9
22	0 16 8.51	2.1272	7 27 37.6
23	0 18 16.16	2.1281	+ 7 41 36.5

JUNE 13.

Hour.	Right Ascension. h m s	Var. per Min. s	Declination. ° ′ ″
0	0 20 23.88	2.1293	+ 7 55 32.4
1	0 22 31.67	2.1303	8 9 25.5
2	0 24 39.52	2.1315	8 23 15.5
3	0 26 47.45	2.1328	8 37 2.4
4	0 28 55.45	2.1341	8 50 46.2
5	0 31 3.54	2.1355	9 4 26.8
6	0 33 11.71	2.1368	9 18 4.1
7	0 35 19.96	2.1383	9 31 38.0
8	0 37 28.31	2.1399	9 45 8.4
9	0 39 36.75	2.1415	9 58 35.4
10	0 41 45.29	2.1431	10 11 58.8
11	0 43 53.92	2.1448	10 25 18.6
12	0 46 2.66	2.1466	10 38 34.6
13	0 48 11.51	2.1484	10 51 46.9
14	0 50 20.47	2.1502	11 4 55.3
15	0 52 29.53	2.1521	11 17 59.8
16	0 54 38.72	2.1541	11 31 0.3
17	0 56 48.02	2.1561	11 43 56.8
18	0 58 57.45	2.1582	11 56 49.1
19	1 1 7.00	2.1603	12 9 37.3
20	1 3 16.68	2.1623	12 22 21.2
21	1 5 26.48	2.1645	12 35 0.7
22	1 7 36.42	2.1668	12 47 35.9
23	1 9 46.49	2.1690	13 0 6.6
24	1 11 56.70	2.1713	+13 12 32.5

MEAN TIME.

MEAN TIME.

MEAN TIME.

MEAN TIME.

GREENWICH MEAN TIME.

JUNE 30.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
	h m s	s	° ′ ″	″
0	14 28 3.92	2.2158	−19 27 36.6	−8.945
1	14 30 17.08	2.2228	19 36 30.6	8.855
2	14 32 30.66	2.2298	19 45 19.2	8.764
3	14 34 44.66	2.2369	19 54 2.3	8.672
4	14 36 59.09	2.2440	20 2 39.8	8.578
5	14 39 13.94	2.2511	20 11 11.6	8.483
6	14 41 29.22	2.2583	20 19 37.7	8.386
7	14 43 44.93	2.2654	20 27 57.9	8.288
8	14 46 1.07	2.2725	20 36 12.2	8.188
9	14 48 17.63	2.2796	20 44 20.4	8.087
10	14 50 34.62	2.2868	20 52 22.6	7.984
11	14 52 52.04	2.2939	21 0 18.5	7.880
12	14 55 9.89	2.3011	21 8 8.2	7.775
13	14 57 28.17	2.3083	21 15 51.5	7.668
14	14 59 46.88	2.3153	21 23 28.4	7.561
15	15 2 6.01	2.3225	21 30 58.8	7.451
16	15 4 25.58	2.3297	21 38 22.5	7.339
17	15 6 45.57	2.3368	21 45 39.5	7.227
18	15 9 5.99	2.3438	21 52 49.7	7.113
19	15 11 26.83	2.3509	21 59 53.1	6.998
20	15 13 48.10	2.3580	22 6 49.4	6.881
21	15 16 9.79	2.3650	22 13 38.8	6.763
22	15 18 31.90	2.3721	22 20 20.9	6.643
23	15 20 54.44	2.3790	−22 26 55.9	−6.523

JULY 1.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
0	15 23 17.38	2.3859	−22 33 23.6	−6.400
1	15 25 40.75	2.3930	22 39 43.9	6.276
2	15 28 4.54	2.3998	22 45 56.7	6.150
3	15 30 28.73	2.4067	22 52 1.9	6.023
4	15 32 53.34	2.4135	22 57 59.4	5.894
5	15 35 18.35	2.4203	23 3 49.2	5.765
6	15 37 43.77	2.4270	23 9 31.2	5.634
7	15 40 9.59	2.4337	23 15 5.3	5.502
8	15 42 35.81	2.4403	23 20 31.4	5.368
9	15 45 2.42	2.4468	23 25 49.4	5.233
10	15 47 29.43	2.4533	23 30 59.3	5.096
11	15 49 56.82	2.4598	23 36 0.9	4.958
12	15 52 24.60	2.4662	23 40 54.3	4.819
13	15 54 52.76	2.4725	23 45 39.2	4.678
14	15 57 21.30	2.4787	23 50 15.7	4.537
15	15 59 50.20	2.4848	23 54 43.6	4.393
16	16 2 19.48	2.4910	23 59 2.9	4.248
17	16 4 49.12	2.4969	24 3 13.4	4.103
18	16 7 19.11	2.5028	24 7 15.2	3.956
19	16 9 49.46	2.5087	24 11 8.1	3.808
20	16 12 20.15	2.5144	24 14 52.1	3.658
21	16 14 51.19	2.5201	24 18 27.1	3.508
22	16 17 22.56	2.5256	24 21 53.0	3.355
23	16 19 54.26	2.5310	24 25 9.7	3.202
24	*16 22 26.28*	*2.5364*	*−24 28 17.2*	*−3.048*

JULY 2.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
	h m s	s	° ′ ″	″
0	16 22 26.28	2.5364	−24 28 17.2	−3.048
1	16 24 58.63	2.5417	24 31 15.4	2.893
2	16 27 31.28	2.5468	24 34 4.3	2.736
3	16 30 4.25	2.5519	24 36 43.7	2.578
4	16 32 37.51	2.5568	24 39 13.7	2.420
5	16 35 11.07	2.5617	24 41 34.1	2.259
6	16 37 44.91	2.5663	24 43 44.8	2.098
7	16 40 19.03	2.5709	24 45 45.9	1.938
8	16 42 53.42	2.5754	24 47 37.3	1.775
9	16 45 28.08	2.5798	24 49 18.9	1.612
10	16 48 2.99	2.5840	24 50 50.7	1.448
11	16 50 38.16	2.5881	24 52 12.6	1.282
12	16 53 13.56	2.5920	24 53 24.5	1.115
13	16 55 49.20	2.5959	24 54 26.4	0.948
14	16 58 25.07	2.5996	24 55 18.3	0.781
15	17 1 1.15	2.6031	24 56 0.1	0.613
16	17 3 37.44	2.6066	24 56 31.8	0.443
17	17 6 13.94	2.6098	24 56 53.3	0.273
18	17 8 50.62	2.6129	24 57 4.6	−0.103
19	17 11 27.49	2.6160	24 57 5.6	+0.068
20	17 14 4.54	2.6188	24 56 56.4	0.240
21	17 16 41.75	2.6216	24 56 36.8	0.413
22	17 19 19.13	2.6242	24 56 6.9	0.585
23	17 21 56.65	2.6265	−24 55 26.6	+0.758

JULY 3.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
0	17 24 34.31	2.6288	−24 54 35.9	+0.932
1	17 27 12.11	2.6309	24 53 31.8	1.106
2	17 29 50.02	2.6328	24 52 23.2	1.280
3	17 32 28.05	2.6348	24 51 1.2	1.454
4	17 35 6.19	2.6364	24 49 28.7	1.629
5	17 37 44.42	2.6379	24 47 45.7	1.805
6	17 40 22.74	2.6393	24 45 52.1	1.980
7	17 43 1.13	2.6405	24 43 48.1	2.155
8	17 45 39.60	2.6416	24 41 33.5	2.331
9	17 48 18.12	2.6424	24 39 8.4	2.507
10	17 50 56.69	2.6433	24 36 32.7	2.683
11	17 53 35.31	2.6439	24 33 46.5	2.858
12	17 56 13.96	2.6443	24 30 49.7	3.034
13	17 58 52.63	2.6446	24 27 42.4	3.209
14	18 1 31.31	2.6448	24 24 24.6	3.385
15	18 4 10.00	2.6448	24 20 56.2	3.560
16	18 6 48.68	2.6446	24 17 17.4	3.735
17	18 9 27.35	2.6443	24 13 28.0	3.910
18	18 12 6.00	2.6438	24 9 28.2	4.084
19	18 14 44.61	2.6433	24 5 17.9	4.258
20	18 17 23.19	2.6425	24 0 57.2	4.433
21	18 20 1.71	2.6416	23 56 26.0	4.606
22	18 22 40.18	2.6406	23 51 44.5	4.779
23	18 25 18.58	2.6394	23 46 52.5	4.952
24	18 27 56.91	2.6381	−23 41 50.3	+5.123

MEAN TIME.

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MEAN TIME.

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
	JULY 20.			
	h m s	s	° ′ ″	″
0	8 55 49.77	1.9205	+14 28 18.8	−10.447
1	8 57 44.89	1.9169	14 17 50.3	10.502
2	8 59 39.80	1.9134	14 7 18.6	10.556
3	9 1 34.50	1.9098	13 56 43.6	10.609
4	9 3 28.98	1.9063	13 46 5.5	10.661
5	9 5 23.26	1.9029	13 35 24.3	10.713
6	9 7 17.33	1.8995	13 24 40.0	10.763
7	9 9 11.20	1.8962	13 13 52.8	10.813
8	9 11 4.87	1.8929	13 3 2.5	10.862
9	9 12 58.35	1.8896	12 52 9.4	10.909
10	9 14 51.62	1.8863	12 41 13.4	10.957
11	9 16 44.71	1.8833	12 30 14.6	11.003
12	9 18 37.61	1.8801	12 19 13.0	11.049
13	9 20 30.32	1.8769	12 8 8.7	11.093
14	9 22 22.84	1.8739	11 57 1.8	11.138
15	9 24 15.19	1.8709	11 45 52.2	11.181
16	9 26 7.35	1.8679	11 34 40.1	11.223
17	9 27 59.34	1.8651	11 23 25.4	11.265
18	9 29 51.16	1.8622	11 12 8.3	11.306
19	9 31 42.80	1.8593	11 0 48.7	11.347
20	9 33 34.28	1.8566	10 49 26.7	11.386
21	9 35 25.59	1.8538	10 38 2.4	11.424
22	9 37 16.74	1.8512	10 26 35.8	11.462
23	9 39 7.73	1.8485	+10 15 7.0	−11.499
	JULY 21.			
0	9 40 58.56	1.8459	+10 3 35.9	−11.536
1	9 42 49.24	1.8434	9 52 2.7	11.572
2	9 44 39.77	1.8410	9 40 27.3	11.607
3	9 46 30.16	1.8386	9 28 49.9	11.640
4	9 48 20.40	1.8362	9 17 10.5	11.674
5	9 50 10.50	1.8339	9 5 29.0	11.707
6	9 52 0.47	1.8317	8 53 45.7	11.738
7	9 53 50.30	1.8294	8 42 0.4	11.770
8	9 55 40.00	1.8273	8 30 13.3	11.801
9	9 57 29.57	1.8252	8 18 24.3	11.831
10	9 59 19.02	1.8231	8 6 33.6	11.860
11	10 1 8.34	1.8211	7 54 41.1	11.888
12	10 2 57.55	1.8192	7 42 47.0	11.916
13	10 4 46.64	1.8173	7 30 51.2	11.943
14	10 6 35.62	1.8155	7 18 53.9	11.969
15	10 8 24.50	1.8137	7 6 54.9	11.995
16	10 10 13.26	1.8119	6 54 54.5	12.019
17	10 12 1.93	1.8103	6 42 52.6	12.043
18	10 13 50.50	1.8087	6 30 49.3	12.068
19	10 15 38.97	1.8071	6 18 44.5	12.090
20	10 17 27.35	1.8056	6 6 38.5	12.112
21	10 19 15.64	1.8042	5 54 31.1	12.134
22	10 21 3.85	1.8028	5 42 22.4	12.154
23	10 22 51.98	1.8015	5 30 12.6	12.173
24	10 24 40.03	1.8003	+ 5 18 1.6	−12.193

Hour.	Right Ascension.	Var. per Min.	Declination.
	JULY 22.		
	h m s	s	° ′ ″
0	10 24 40.03	1.8003	+5 18 1.6
1	10 26 28.01	1.7990	5 5 49.4
2	10 28 15.91	1.7978	4 53 36.2
3	10 30 3.75	1.7968	4 41 21.8
4	10 31 51.53	1.7958	4 29 6.4
5	10 33 39.24	1.7948	4 16 50.1
6	10 35 26.90	1.7939	4 4 32.8
7	10 37 14.51	1.7930	3 52 14.6
8	10 39 2.06	1.7922	3 39 55.6
9	10 40 49.57	1.7915	3 27 35.7
10	10 42 37.04	1.7908	3 15 15.0
11	10 44 24.47	1.7903	3 2 53.6
12	10 46 11.87	1.7897	2 50 31.5
13	10 47 59.23	1.7892	2 38 8.7
14	10 49 46.57	1.7888	2 25 45.3
15	10 51 33.88	1.7883	2 13 21.3
16	10 53 21.17	1.7881	2 0 56.8
17	10 55 8.45	1.7878	1 48 31.7
18	10 56 55.71	1.7876	1 36 6.2
19	10 58 42.96	1.7875	1 23 40.3
20	11 0 30.21	1.7874	1 11 13.9
21	11 2 17.45	1.7874	0 58 47.2
22	11 4 4.70	1.7875	0 46 20.2
23	11 5 51.95	1.7877	+0 33 53.0
	JULY 23.		
0	11 7 39.22	1.7879	+0 21 25.5
1	11 9 26.50	1.7881	+0 8 57.8
2	11 11 13.79	1.7884	−0 3 30.0
3	11 13 1.11	1.7888	0 15 58.0
4	11 14 48.44	1.7892	0 28 26.0
5	11 16 35.81	1.7898	0 40 54.1
6	11 18 23.21	1.7903	0 53 22.2
7	11 20 10.65	1.7909	1 5 50.3
8	11 21 58.12	1.7916	1 18 18.3
9	11 23 45.64	1.7924	1 30 46.1
10	11 25 33.21	1.7932	1 43 13.9
11	11 27 20.82	1.7941	1 55 41.4
12	11 29 8.50	1.7951	2 8 8.7
13	11 30 56.23	1.7961	2 20 35.8
14	11 32 44.03	1.7972	2 33 2.5
15	11 34 31.89	1.7983	2 45 28.9
16	11 36 19.83	1.7996	2 57 54.9
17	11 38 7.84	1.8008	3 10 20.5
18	11 39 55.92	1.8022	3 22 45.6
19	11 41 44.10	1.8036	3 35 10.3
20	11 43 32.35	1.8050	3 47 34.4
21	11 45 20.70	1.8067	3 59 57.9
22	11 47 9.15	1.8083	4 12 20.8
23	11 48 57.69	1.8098	4 24 43.0
24	11 50 46.33	1.8116	−4 37 4.5

MEAN TIME.

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
	JULY 28.			
	h m s	s	° ′ ″	″
0	15 2 19.98	2.2644	−21 28 49.7	−7.259
1	15 4 36.05	2.2713	21 36 2.1	7.153
2	15 6 52.53	2.2780	21 43 8.1	7.047
3	15 9 9.41	2.2848	21 50 7.7	6.939
4	15 11 26.70	2.2915	21 57 0.8	6.830
5	15 13 44.39	2.2983	22 3 47.3	6.719
6	15 16 2.49	2.3051	22 10 27.1	6.608
7	15 18 21.00	2.3118	22 17 0.2	6.494
8	15 20 39.90	2.3185	22 23 26.4	6.380
9	15 22 59.22	2.3253	22 29 45.8	6.264
10	15 25 18.93	2.3319	22 35 58.1	6.147
11	15 27 39.05	2.3386	22 42 3.4	6.029
12	15 29 59.56	2.3453	22 48 1.6	5.910
13	15 32 20.48	2.3519	22 53 52.6	5.788
14	15 34 41.79	2.3585	22 59 36.2	5.666
15	15 37 3.50	2.3652	23 5 12.5	5.543
16	15 39 25.61	2.3718	23 10 41.3	5.417
17	15 41 48.11	2.3783	23 16 2.5	5.291
18	15 44 11.00	2.3847	23 21 16.2	5.164
19	15 46 34.27	2.3912	23 26 22.2	5.035
20	15 48 57.94	2.3976	23 31 20.4	4.905
21	15 51 21.98	2.4039	23 36 10.8	4.774
22	15 53 46.41	2.4103	23 40 53.3	4.642
23	15 56 11.22	2.4166	−23 45 27.8	−4.508
	JULY 29.			
0	15 58 36.40	2.4228	−23 49 54.3	−4.373
1	16 1 1.95	2.4290	23 54 12.6	4.237
2	16 3 27.88	2.4351	23 58 22.7	4.099
3	16 5 54.16	2.4411	24 2 24.5	3.960
4	16 8 20.81	2.4472	24 6 17.9	3.820
5	16 10 47.82	2.4531	24 10 2.9	3.679
6	16 13 15.18	2.4589	24 13 39.4	3.538
7	16 15 42.89	2.4647	24 17 7.4	3.394
8	16 18 10.94	2.4704	24 20 26.7	3.248
9	16 20 39.34	2.4761	24 23 37.2	3.103
10	16 23 8.07	2.4816	24 26 39.1	2.957
11	16 25 37.13	2.4871	24 29 32.0	2.808
12	16 28 6.52	2.4925	24 32 16.1	2.660
13	16 30 36.23	2.4979	24 34 51.2	2.509
14	16 33 6.27	2.5032	24 37 17.2	2.358
15	16 35 36.61	2.5083	24 39 34.1	2.205
16	16 38 7.26	2.5133	24 41 41.8	2.053
17	16 40 38.20	2.5183	24 43 40.4	1.898
18	16 43 9.45	2.5232	24 45 29.6	1.743
19	16 45 40.98	2.5279	24 47 9.5	1.586
20	16 48 12.80	2.5326	24 48 39.9	1.428
21	16 50 44.89	2.5372	24 50 0.9	1.271
22	16 53 17.26	2.5416	24 51 12.4	1.112
23	16 55 49.88	2.5459	24 52 14.3	0.952
24	*16 58 22.77*	*2.5503*	*−24 53 6.6*	−0.791

Hour.	Right Ascension.	Var. per Min.	Declinatio
	JULY 30.		
	h m s	s	° ′ ′
0	16 58 22.77	2.5503	−24 53 6.
1	17 0 55.91	2.5543	24 53 49.
2	17 3 29.29	2.5583	24 54 22.
3	17 6 2.91	2.5623	24 54 45.
4	17 8 36.76	2.5661	24 54 58.
5	17 11 10.84	2.5698	24 55 2.
6	17 13 45.13	2.5733	24 54 55.
7	17 16 19.63	2.5766	24 54 39.
8	17 18 54.34	2.5800	24 54 12.
9	17 21 29.23	2.5832	24 53 36.
10	17 24 4.32	2.5863	24 52 49.
11	17 26 39.59	2.5893	24 51 53.
12	17 29 15.03	2.5920	24 50 46.
13	17 31 50.63	2.5947	24 49 29.
14	17 34 26.39	2.5973	24 48 2.
15	17 37 2.30	2.5997	24 46 25.
16	17 39 38.35	2.6019	24 44 38.
17	17 42 14.53	2.6041	24 42 40
18	17 44 50.84	2.6062	24 40 32
19	17 47 27.27	2.6080	24 38 14
20	17 50 3.80	2.6098	24 35 45
21	17 52 40.44	2.6113	24 33 7
22	17 55 17.16	2.6128	24 30 17
23	17 57 53.98	2.6143	−24 27 18
	JULY 31.		
0	18 0 30.87	2.6154	−24 24 8
1	18 3 7.83	2.6165	24 20 48
2	18 5 44.85	2.6174	24 17 17
3	18 8 21.92	2.6182	24 13 36
4	18 10 59.03	2.6188	24 9 45
5	18 13 36.18	2.6194	24 5 44
6	18 16 13.36	2.6198	24 1 32
7	18 18 50.56	2.6201	23 57 9
8	18 21 27.77	2.6203	23 52 37
9	18 24 4.99	2.6203	23 47 54
10	18 26 42.20	2.6201	23 43 1
11	18 29 19.40	2.6198	23 37 57
12	18 31 56.58	2.6194	23 32 44
13	18 34 33.73	2.6189	23 27 20
14	18 37 10.85	2.6183	23 21 45
15	18 39 47.93	2.6175	23 16 1
16	18 42 24.95	2.6166	23 10 7
17	18 45 1.92	2.6157	23 4 2
18	18 47 38.83	2.6145	22 57 47
19	18 50 15.66	2.6132	22 51 23
20	18 52 52.41	2.6118	22 44 48
21	18 55 29.08	2.6104	22 38 3
22	18 58 5.66	2.6088	22 31 8
23	19 0 42.14	2.6070	22 24 4
24	19 3 18.50	2.6051	−22 18 50

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GREENWICH MEAN TIME.

Right Ascension.	Var. per Min.	Declination.	Var. per Min.
SEPTEMBER 2.			
h m s	s	° ′ ″	″
3 28 15.03	2.2996	+ 1 53 28.8	+15.817
3 30 32.99	2.2992	2 9 17.2	15.796
3 32 50.93	2.2987	2 25 4.3	15.773
3 35 8.83	2.2982	2 40 49.9	15.747
3 37 26.71	2.2978	2 56 33.9	15.719
3 39 44.57	2.2974	3 12 16.2	15.691
3 42 2.40	2.2971	3 27 56.8	15.660
3 44 20.22	2.2969	3 43 35.4	15.627
3 46 38.03	2.2968	3 59 12.0	15.593
3 48 55.83	2.2966	4 14 46.6	15.558
3 51 13.62	2.2964	4 30 18.9	15.518
3 53 31.40	2.2963	4 45 48.8	15.478
3 55 49.18	2.2964	5 1 16.3	15.438
3 58 6.97	2.2965	5 16 41.3	15.394
0 0 24.76	2.2966	5 32 3.6	15.349
0 2 42.56	2.2968	5 47 23.2	15.303
0 5 0.37	2.2969	6 2 39.9	15.253
0 7 18.19	2.2972	6 17 53.6	15.203
0 9 36.03	2.2975	6 33 4.3	15.152
0 11 53.89	2.2978	6 48 11.8	15.098
0 14 11.77	2.2982	7 3 16.0	15.043
0 16 29.67	2.2987	7 18 16.9	14.986
0 18 47.61	2.2992	7 33 14.3	14.928
0 21 5.57	2.2996	+ 7 48 8.2	+14.867
SEPTEMBER 3.			
0 23 23.56	2.3002	+ 8 2 58.3	+14.804
0 25 41.59	2.3008	8 17 44.7	14.742
0 27 59.65	2.3014	8 32 27.3	14.676
0 30 17.76	2.3021	8 47 5.8	14.609
0 32 35.90	2.3028	9 1 40.4	14.542
0 34 54.09	2.3036	9 16 10.8	14.471
0 37 12.33	2.3044	9 30 36.9	14.399
0 39 30.62	2.3052	9 44 58.7	14.327
0 41 48.95	2.3060	9 59 16.1	14.253
0 44 7.34	2.3069	10 13 29.0	14.177
0 46 25.78	2.3078	10 27 37.3	14.099
0 48 44.28	2.3088	10 41 40.9	14.020
0 51 2.84	2.3098	10 55 39.7	13.939
0 53 21.46	2.3108	11 9 33.6	13.858
0 55 40.14	2.3119	11 23 22.6	13.775
0 57 58.89	2.3130	11 37 6.6	13.690
1 0 17.70	2.3140	11 50 45.4	13.603
1 2 36.57	2.3152	12 4 19.0	13.517
1 4 55.52	2.3164	12 17 47.4	13.428
1 7 14.54	2.3176	12 31 10.4	13.338
1 9 33.63	2.3188	12 44 27.9	13.246
1 11 52.79	2.3199	12 57 39.9	13.153
1 14 12.02	2.3212	13 10 46.3	13.059
1 16 31.33	2.3225	13 23 47.0	12.963
1 18 50.72	*2.3238*	*+13 36 41.9*	*+12.867*

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
	SEPTEMBER 4.			
	h m s	s	° ′ ″	″
0	1 18 50.72	2.3238	+13 36 41.9	+12.867
1	1 21 10.18	2.3251	13 49 31.0	12.769
2	1 23 29.73	2.3264	14 2 14.2	12.669
3	1 25 49.35	2.3277	14 14 51.3	12.569
4	1 28 9.05	2.3290	14 27 22.5	12.468
5	1 30 28.83	2.3303	14 39 47.4	12.364
6	1 32 48.69	2.3318	14 52 6.2	12.261
7	1 35 8.64	2.3331	15 4 18.7	12.156
8	1 37 28.66	2.3344	15 16 24.9	12.049
9	1 39 48.77	2.3359	15 28 24.6	11.942
10	1 42 8.97	2.3373	15 40 17.9	11.833
11	1 44 29.24	2.3386	15 52 4.6	11.724
12	1 46 49.60	2.3400	16 3 44.8	11.614
13	1 49 10.04	2.3414	16 15 18.3	11.502
14	1 51 30.57	2.3428	16 26 45.0	11.388
15	1 53 51.18	2.3442	16 38 4.9	11.274
16	1 56 11.87	2.3455	16 49 17.9	11.159
17	1 58 32.64	2.3469	17 0 24.0	11.044
18	2 0 53.50	2.3483	17 11 23.2	10.927
19	2 3 14.44	2.3497	17 22 15.2	10.808
20	2 5 35.46	2.3510	17 33 0.2	10.691
21	2 7 56.56	2.3523	17 43 38.1	10.571
22	2 10 17.74	2.3537	17 54 8.7	10.450
23	2 12 39.00	2.3550	+18 4 32.1	+10.329
	SEPTEMBER 5.			
0	2 15 0.34	2.3563	+18 14 48.2	+10.207
1	2 17 21.76	2.3576	18 24 56.9	10.083
2	2 19 43.25	2.3588	18 34 58.2	9.960
3	2 22 4.82	2.3601	18 44 52.1	9.835
4	2 24 26.46	2.3613	18 54 38.4	9.709
5	2 26 48.18	2.3625	19 4 17.2	9.583
6	2 29 9.96	2.3637	19 13 48.4	9.456
7	2 31 31.82	2.3649	19 23 11.9	9.328
8	2 33 53.75	2.3660	19 32 27.7	9.199
9	2 36 15.74	2.3671	19 41 35.8	9.071
10	2 38 37.80	2.3682	19 50 36.2	8.941
11	2 40 59.92	2.3692	19 59 28.7	8.810
12	2 43 22.10	2.3702	20 8 13.4	8.679
13	2 45 44.34	2.3712	20 16 50.2	8.548
14	2 48 6.64	2.3721	20 25 19.1	8.415
15	2 50 28.99	2.3730	20 33 40.0	8.282
16	2 52 51.40	2.3738	20 41 52.9	8.148
17	2 55 13.85	2.3747	20 49 57.7	8.013
18	2 57 36.36	2.3755	20 57 54.5	7.880
19	2 59 58.91	2.3762	21 5 43.3	7.745
20	3 2 21.50	2.3768	21 13 23.9	7.608
21	3 4 44.13	2.3776	21 20 56.3	7.473
22	3 7 6.81	2.3783	21 28 20.6	7.336
23	3 9 29.52	2.3788	21 35 36.6	7.199
24	3 11 52.26	2.3793	+21 42 44.5	+7.063

MEAN TIME.

MEAN TIME.

GREENWICH MEAN TIME.

SEPTEMBER 14.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
	h m s	s	° ′ ″	″
0	10 2 39.91	1.8239	+7 46 24.1	−11.756
1	10 4 29.30	1.8223	7 34 37.9	11.781
2	10 6 18.59	1.8208	7 22 50.0	11.812
3	10 8 7.80	1.8193	7 11 0.5	11.840
4	10 9 56.91	1.8178	6 59 9.2	11.868
5	10 11 45.94	1.8165	6 47 16.4	11.893
6	10 13 34.89	1.8152	6 35 22.1	11.918
7	10 15 23.76	1.8138	6 23 26.3	11.943
8	10 17 12.55	1.8127	6 11 28.9	11.968
9	10 19 1.28	1.8115	5 59 30.2	11.990
10	10 20 49.93	1.8103	5 47 30.1	12.013
11	10 22 38.51	1.8092	5 35 28.6	12.035
12	10 24 27.03	1.8082	5 23 25.9	12.056
13	10 26 15.49	1.8073	5 11 21.9	12.077
14	10 28 3.90	1.8063	4 59 16.7	12.096
15	10 29 52.25	1.8054	4 47 10.4	12.115
16	10 31 40.55	1.8046	4 35 2.9	12.134
17	10 33 28.80	1.8038	4 22 54.3	12.152
18	10 35 17.01	1.8031	4 10 44.7	12.169
19	10 37 5.17	1.8024	3 58 34.0	12.185
20	10 38 53.30	1.8019	3 46 22.5	12.200
21	10 40 41.40	1.8013	3 34 10.0	12.216
22	10 42 29.46	1.8008	3 21 56.6	12.230
23	10 44 17.50	1.8003	+3 9 42.4	−12.243

SEPTEMBER 15.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
0	10 46 5.50	1.7999	+2 57 27.4	−12.256
1	10 47 53.49	1.7996	2 45 11.7	12.268
2	10 49 41.45	1.7993	2 32 55.3	12.279
3	10 51 29.40	1.7991	2 20 38.2	12.291
4	10 53 17.34	1.7989	2 8 20.4	12.301
5	10 55 5.27	1.7988	1 56 2.1	12.309
6	10 56 53.20	1.7988	1 43 43.3	12.318
7	10 58 41.12	1.7988	1 31 24.0	12.326
8	11 0 29.05	1.7988	1 19 4.2	12.333
9	11 2 16.97	1.7988	1 6 44.0	12.340
10	11 4 4.91	1.7990	0 54 23.4	12.346
11	11 5 52.85	1.7992	0 42 2.5	12.350
12	11 7 40.81	1.7994	0 29 41.4	12.354
13	11 9 28.78	1.7998	0 17 20.0	12.358
14	11 11 16.78	1.8002	+0 4 58.4	12.362
15	11 13 4.80	1.8005	−0 7 23.4	12.364
16	11 14 52.84	1.8009	0 19 45.3	12.366
17	11 16 40.91	1.8015	0 32 7.3	12.367
18	11 18 29.02	1.8021	0 44 29.3	12.366
19	11 20 17.16	1.8027	0 56 51.2	12.365
20	11 22 5.34	1.8034	1 9 13.1	12.364
21	11 23 53.57	1.8042	1 21 34.9	12.363
22	11 25 41.84	1.8049	1 33 56.6	12.359
23	11 27 30.16	1.8057	1 46 18.0	12.356
24	11 29 18.52	1.8066	−1 58 39.3	−12.353

SEPTEMBER 16.

Hour.	Right Ascension.	Var. per Min.	Declination.
	h m s	s	° ′ ″
0	11 29 18.52	1.8066	− 1 58 39.3
1	11 31 6.95	1.8076	2 11 0.3
2	11 32 55.43	1.8086	2 23 20.9
3	11 34 43.98	1.8097	2 35 41.2
4	11 36 32.59	1.8108	2 48 1.1
5	11 38 21.27	1.8119	3 0 20.5
6	11 40 10.02	1.8132	3 12 39.4
7	11 41 58.85	1.8144	3 24 57.8
8	11 43 47.75	1.8158	3 37 15.6
9	11 45 36.74	1.8172	3 49 32.8
10	11 47 25.81	1.8186	4 1 49.3
11	11 49 14.97	1.8200	4 14 5.1
12	11 51 4.21	1.8215	4 26 20.1
13	11 52 53.55	1.8233	4 38 34.3
14	11 54 43.00	1.8249	4 50 47.7
15	11 56 32.54	1.8265	5 3 0.2
16	11 58 22.18	1.8283	5 15 11.7
17	12 0 11.94	1.8302	5 27 22.3
18	12 2 1.80	1.8320	5 39 31.8
19	12 3 51.78	1.8339	5 51 40.2
20	12 5 41.87	1.8358	6 3 47.6
21	12 7 32.08	1.8379	6 15 53.7
22	12 9 22.42	1.8400	6 27 58.6
23	12 11 12.88	1.8421	− 6 40 2.3

SEPTEMBER 17.

Hour.	Right Ascension.	Var. per Min.	Declination.
0	12 13 3.47	1.8443	− 6 52 4.6
1	12 14 54.20	1.8466	7 4 5.6
2	12 16 45.06	1.8488	7 16 5.2
3	12 18 36.06	1.8512	7 28 3.3
4	12 20 27.20	1.8535	7 39 59.9
5	12 22 18.48	1.8560	7 51 55.0
6	12 24 9.92	1.8585	8 3 48.5
7	12 26 1.50	1.8610	8 15 40.3
8	12 27 53.24	1.8637	8 27 30.5
9	12 29 45.14	1.8663	8 39 18.9
10	12 31 37.20	1.8689	8 51 5.5
11	12 33 29.41	1.8717	9 2 50.2
12	12 35 21.80	1.8746	9 14 33.1
13	12 37 14.36	1.8774	9 26 14.1
14	12 39 7.09	1.8803	9 37 53.1
15	12 40 59.99	1.8833	9 49 30.0
16	12 42 53.08	1.8863	10 1 4.9
17	12 44 46.34	1.8893	10 12 37.6
18	12 46 39.79	1.8924	10 24 8.2
19	12 48 33.43	1.8956	10 35 36.5
20	12 50 27.26	1.8988	10 47 2.5
21	12 52 21.29	1.9021	10 58 26.3
22	12 54 15.51	1.9053	11 9 47.6
23	12 56 9.92	1.9086	11 21 6.5
24	12 58 4.54	1.9121	−11 32 22.8

MEAN TIME.

MEAN TIME.

MEAN TIME.

MEAN TIME.

MEAN TIME.

GREENWICH MEAN TIME.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
	OCTOBER 8.			
	h m s	s	° ′ ″	″
0	7 30 8.33	2.1018	+20 27 6.4	− 7.165
1	7 32 14.29	2.0969	20 19 53.8	7.253
2	7 34 19.96	2.0920	20 12 36.0	7.341
3	7 36 25.33	2.0870	20 5 12.9	7.428
4	7 38 30.40	2.0822	19 57 44.7	7.513
5	7 40 35.19	2.0773	19 50 11.4	7.598
6	7 42 39.67	2.0723	19 42 33.0	7.683
7	7 44 43.87	2.0676	19 34 49.5	7.765
8	7 46 47.78	2.0627	19 27 1.2	7.847
9	7 48 51.39	2.0578	19 19 7.9	7.928
10	7 50 54.72	2.0532	19 11 9.8	8.008
11	7 52 57.77	2.0484	19 3 6.9	8.088
12	7 55 0.53	2.0437	18 54 59.2	8.167
13	7 57 3.01	2.0390	18 46 46.9	8.245
14	7 59 5.21	2.0343	18 38 29.8	8.323
15	8 1 7.13	2.0297	18 30 8.2	8.398
16	8 3 8.77	2.0250	18 21 42.1	8.473
17	8 5 10.13	2.0205	18 13 11.5	8.548
18	8 7 11.23	2.0160	18 4 36.4	8.622
19	8 9 12.05	2.0115	17 55 56.9	8.693
20	8 11 12.61	2.0071	17 47 13.2	8.765
21	8 13 12.90	2.0026	17 38 25.1	8.838
22	8 15 12.92	1.9982	17 29 32.7	8.908
23	8 17 12.68	1.9938	+17 20 36.2	− 8.976
	OCTOBER 9.			
0	8 19 12.18	1.9895	+17 11 35.6	− 9.044
1	8 21 11.42	1.9853	17 2 30.9	9.113
2	8 23 10.41	1.9810	16 53 22.1	9.180
3	8 25 9.14	1.9768	16 44 9.3	9.246
4	8 27 7.62	1.9726	16 34 52.6	9.311
5	8 29 5.85	1.9685	16 25 32.0	9.376
6	8 31 3.84	1.9644	16 16 7.5	9.439
7	8 33 1.58	1.9603	16 6 39.3	9.502
8	8 34 59.08	1.9564	15 57 7.3	9.565
9	8 36 56.35	1.9524	15 47 31.5	9.626
10	8 38 53.37	1.9485	15 37 52.2	9.686
11	8 40 50.17	1.9447	15 28 9.2	9.747
12	8 42 46.73	1.9408	15 18 22.6	9.806
13	8 44 43.06	1.9370	15 8 32.5	9.863
14	8 46 39.17	1.9333	14 58 39.0	9.921
15	8 48 35.06	1.9297	14 48 42.0	9.978
16	8 50 30.73	1.9260	14 38 41.6	10.034
17	8 52 26.18	1.9223	14 28 37.9	10.089
18	8 54 21.41	1.9188	14 18 30.9	10.143
19	8 56 16.44	1.9153	14 8 20.7	10.198
20	8 58 11.25	1.9119	13 58 7.2	10.251
21	9 0 5.87	1.9085	13 47 50.6	10.303
22	9 2 0.27	1.9051	13 37 30.8	10.355
23	9 3 54.48	1.9018	13 27 8.0	10.405
24	9 5 48.49	1.8986	+13 16 42.2	−10.455

Hour.	Right Ascension.	Var. per Min.	Declination.
	OCTOBER 10.		
	h m s	s	° ′ ″
0	9 5 48.49	1.8986	+13 16 42.2
1	9 7 42.31	1.8954	13 6 13.4
2	9 9 35.94	1.8923	12 55 41.7
3	9 11 29.38	1.8891	12 45 7.0
4	9 13 22.63	1.8860	12 34 29.5
5	9 15 15.70	1.8831	12 23 49.2
6	9 17 8.60	1.8802	12 13 6.1
7	9 19 1.32	1.8773	12 2 20.3
8	9 20 53.87	1.8744	11 51 31.8
9	9 22 46.25	1.8716	11 40 40.6
10	9 24 38.46	1.8688	11 29 46.9
11	9 26 30.51	1.8662	11 18 50.5
12	9 28 22.40	1.8635	11 7 51.7
13	9 30 14.13	1.8609	10 56 50.4
14	9 32 5.71	1.8584	10 45 46.7
15	9 33 57.14	1.8560	10 34 40.6
16	9 35 48.43	1.8536	10 23 32.1
17	9 37 39.57	1.8512	10 12 21.3
18	9 39 30.57	1.8489	10 1 8.3
19	9 41 21.44	1.8467	9 49 53.0
20	9 43 12.17	1.8444	9 38 35.8
21	9 45 2.77	1.8423	9 27 15.8
22	9 46 53.25	1.8403	9 15 54.1
23	9 48 43.60	1.8382	+ 9 4 30.3
	OCTOBER 11.		
0	9 50 33.83	1.8363	+ 8 53 4.
1	9 52 23.95	1.8343	8 41 36.
2	9 54 13.95	1.8324	8 30 6.
3	9 56 3.84	1.8306	8 18 35.
4	9 57 53.62	1.8288	8 7 1.
5	9 59 43.30	1.8272	7 55 26.
6	10 1 32.88	1.8256	7 43 49.
7	10 3 22.37	1.8240	7 32 10.
8	10 5 11.76	1.8224	7 20 29.
9	10 7 1.06	1.8210	7 8 47.
10	10 8 50.28	1.8196	6 57 3.
11	10 10 39.41	1.8182	6 45 17.
12	10 12 28.46	1.8169	6 33 30.
13	10 14 17.44	1.8157	6 21 41.
14	10 16 6.34	1.8145	6 9 51.
15	10 17 55.18	1.8133	5 58 0.
16	10 19 43.94	1.8123	5 46 7.
17	10 21 32.65	1.8113	5 34 13.
18	10 23 21.30	1.8103	5 22 17.
19	10 25 9.89	1.8094	5 10 20.
20	10 26 58.43	1.8085	4 58 22.
21	10 28 46.91	1.8078	4 46 23.
22	10 30 35.36	1.8071	4 34 22.
23	10 32 23.76	1.8063	4 22 21.
24	10 34 12.12	1.8058	+ 4 10 18.

GREENWICH MEAN TIME.

OCTOBER 12.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
	h m s	s	° ′ ″	″
0	10 34 12.12	1.8058	+4 10 18.7	−12.053
1	10 36 0.45	1.8053	3 58 15.0	12.070
2	10 37 48.75	1.8047	3 46 10.3	12.086
3	10 39 37.01	1.8043	3 34 4.7	12.102
4	10 41 25.26	1.8039	3 21 58.1	12.118
5	10 43 13.48	1.8035	3 9 50.6	12.132
6	10 45 1.68	1.8033	2 57 42.3	12.145
7	10 46 49.87	1.8031	2 45 33.2	12.158
8	10 48 38.05	1.8029	2 33 23.3	12.171
9	10 50 26.22	1.8028	2 21 12.7	12.183
10	10 52 14.39	1.8028	2 9 1.4	12.194
11	10 54 2.56	1.8028	1 56 49.4	12.204
12	10 55 50.73	1.8029	1 44 36.9	12.213
13	10 57 38.91	1.8030	1 32 23.8	12.223
14	10 59 27.09	1.8032	1 20 10.2	12.232
15	11 1 15.29	1.8035	1 7 56.0	12.239
16	11 3 3.51	1.8038	0 55 41.5	12.246
17	11 4 51.75	1.8042	0 43 26.5	12.253
18	11 6 40.01	1.8045	0 31 11.2	12.258
19	11 8 28.29	1.8050	0 18 55.5	12.263
20	11 10 16.61	1.8056	+0 6 39.6	12.268
21	11 12 4.96	1.8062	−0 5 36.6	12.271
22	11 13 53.35	1.8068	0 17 52.9	12.274
23	11 15 41.78	1.8075	−0 30 9.5	−12.277

OCTOBER 13.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
0	11 17 30.25	1.8083	−0 42 26.1	−12.278
1	11 19 18.77	1.8091	0 54 42.8	12.278
2	11 21 7.34	1.8100	1 6 59.5	12.278
3	11 22 55.97	1.8109	1 19 16.2	12.278
4	11 24 44.65	1.8118	1 31 32.9	12.277
5	11 26 33.39	1.8129	1 43 49.4	12.275
6	11 28 22.20	1.8141	1 56 5.9	12.273
7	11 30 11.08	1.8153	2 8 22.1	12.269
8	11 32 0.03	1.8164	2 20 38.2	12.265
9	11 33 49.05	1.8177	2 32 53.9	12.260
10	11 35 38.15	1.8190	2 45 9.4	12.255
11	11 37 27.33	1.8204	2 57 24.5	12.248
12	11 39 16.60	1.8219	3 9 39.2	12.242
13	11 41 5.96	1.8233	3 21 53.5	12.233
14	11 42 55.40	1.8248	3 34 7.2	12.225
15	11 44 44.94	1.8265	3 46 20.5	12.217
16	11 46 34.58	1.8283	3 58 33.2	12.206
17	11 48 24.33	1.8299	4 10 45.2	12.195
18	11 50 14.17	1.8317	4 22 56.6	12.184
19	11 52 4.13	1.8335	4 35 7.3	12.173
20	11 53 54.19	1.8354	4 47 17.3	12.159
21	11 55 44.38	1.8373	4 59 26.4	12.145
22	11 57 34.67	1.8393	5 11 34.7	12.131
23	11 59 25.10	1.8414	5 23 42.1	12.116
24	*12 1 15.64*	*1.8434*	*−5 35 48.6*	*−12.100*

OCTOBER 14.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
	h m s	s	° ′ ″	″
0	12 1 15.64	1.8434	− 5 35 48.6	−12.100
1	12 3 6.31	1.8457	5 47 54.1	12.083
2	12 4 57.12	1.8479	5 59 58.6	12.065
3	12 6 48.06	1.8501	6 12 1.9	12.047
4	12 8 39.13	1.8524	6 24 4.2	12.028
5	12 10 30.35	1.8548	6 36 5.3	12.008
6	12 12 21.71	1.8573	6 48 5.2	11.987
7	12 14 13.22	1.8598	7 0 3.7	11.965
8	12 16 4.88	1.8623	7 12 1.0	11.943
9	12 17 56.69	1.8648	7 23 56.9	11.920
10	12 19 48.66	1.8675	7 35 51.4	11.896
11	12 21 40.79	1.8702	7 47 44.4	11.871
12	12 23 33.08	1.8729	7 59 35.9	11.845
13	12 25 25.54	1.8758	8 11 25.8	11.819
14	12 27 18.17	1.8786	8 23 14.2	11.792
15	12 29 10.97	1.8814	8 35 0.8	11.763
16	12 31 3.94	1.8843	8 46 45.8	11.735
17	12 32 57.09	1.8874	8 58 29.0	11.704
18	12 34 50.43	1.8904	9 10 10.3	11.673
19	12 36 43.94	1.8935	9 21 49.8	11.643
20	12 38 37.65	1.8968	9 33 27.4	11.610
21	12 40 31.55	1.8998	9 45 3.0	11.577
22	12 42 25.63	1.9031	9 56 36.6	11.543
23	12 44 19.92	1.9064	−10 8 8.1	−11.508

OCTOBER 15.

Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
0	12 46 14.40	1.9098	−10 19 37.5	−11.472
1	12 48 9.09	1.9132	10 31 4.7	11.435
2	12 50 3.98	1.9165	10 42 29.7	11.398
3	12 51 59.07	1.9200	10 53 52.4	11.359
4	12 53 54.38	1.9236	11 5 12.8	11.319
5	12 55 49.90	1.9271	11 16 30.7	11.278
6	12 57 45.63	1.9307	11 27 46.2	11.238
7	12 59 41.58	1.9344	11 38 59.2	11.196
8	13 1 37.76	1.9381	11 50 9.7	11.153
9	13 3 34.15	1.9418	12 1 17.5	11.108
10	13 5 30.78	1.9457	12 12 22.7	11.063
11	13 7 27.63	1.9494	12 23 25.1	11.017
12	13 9 24.71	1.9533	12 34 24.7	10.970
13	13 11 22.02	1.9572	12 45 21.5	10.923
14	13 13 19.57	1.9612	12 56 15.4	10.874
15	13 15 17.36	1.9653	13 7 6.4	10.824
16	13 17 15.40	1.9693	13 17 54.3	10.773
17	13 19 13.67	1.9733	13 28 39.2	10.723
18	13 21 12.19	1.9774	13 39 21.0	10.670
19	13 23 10.96	1.9815	13 49 59.6	10.617
20	13 25 9.97	1.9858	14 0 35.0	10.562
21	13 27 9.25	1.9900	14 11 7.0	10.506
22	13 29 8.77	1.9942	14 21 35.7	10.450
23	13 31 8.55	1.9985	14 32 1.0	10.393
24	13 33 8.59	2.0028	−14 42 22.8	−10.334

MEAN TIME.

MEAN TIME.

MEAN TIME.

MEAN TIME.

MEAN TIME.

GREENWICH MEAN TIME.

NOVEMBER 9.

Hour.	Right Ascension. h m s	Var. per Min. s	Declination. ° ′ ″	Var. per Min. ″
0	11 3 50.24	1.8023	+0 38 52.8	−12.149
1	11 5 38.39	1.8027	0 26 43.7	12.154
2	11 7 26.56	1.8031	0 14 34.3	12.158
3	11 9 14.76	1.8036	+0 2 24.7	12.163
4	11 11 2.99	1.8042	−0 9 45.2	12.166
5	11 12 51.26	1.8048	0 21 55.2	12.168
6	11 14 39.56	1.8054	0 34 5.4	12.171
7	11 16 27.91	1.8063	0 46 15.7	12.172
8	11 18 16.31	1.8071	0 58 26.0	12.173
9	11 20 4.76	1.8079	1 10 36.4	12.173
10	11 21 53.26	1.8088	1 22 46.8	12.173
11	11 23 41.82	1.8099	1 34 57.1	12.171
12	11 25 30.45	1.8110	1 47 7.3	12.169
13	11 27 19.14	1.8121	1 59 17.4	12.167
14	11 29 7.90	1.8133	2 11 27.3	12.163
15	11 30 56.74	1.8146	2 23 37.0	12.160
16	11 32 45.65	1.8159	2 35 46.5	12.155
17	11 34 34.65	1.8173	2 47 55.6	12.150
18	11 36 23.73	1.8187	3 0 4.5	12.145
19	11 38 12.89	1.8202	3 12 13.0	12.138
20	11 40 2.15	1.8218	3 24 21.0	12.131
21	11 41 51.51	1.8235	3 36 28.7	12.123
22	11 43 40.97	1.8252	3 48 35.8	12.114
23	11 45 30.53	1.8269	−4 0 42.4	−12.105

NOVEMBER 10.

Hour.	Right Ascension. h m s	Var. per Min. s	Declination. ° ′ ″	Var. per Min. ″
0	11 47 20.20	1.8288	−4 12 48.4	−12.095
1	11 49 9.98	1.8307	4 24 53.8	12.085
2	11 50 59.88	1.8326	4 36 58.6	12.073
3	11 52 49.89	1.8346	4 49 2.6	12.061
4	11 54 40.03	1.8368	5 1 5.9	12.048
5	11 56 30.30	1.8388	5 13 8.4	12.035
6	11 58 20.69	1.8410	5 25 10.1	12.021
7	12 0 11.22	1.8433	5 37 10.9	12.006
8	12 2 1.88	1.8456	5 49 10.8	11.990
9	12 3 52.69	1.8479	6 1 9.7	11.973
10	12 5 43.63	1.8503	6 13 7.6	11.957
11	12 7 34.73	1.8529	6 25 4.5	11.938
12	12 9 25.98	1.8555	6 37 0.2	11.919
13	12 11 17.39	1.8581	6 48 54.8	11.901
14	12 13 8.95	1.8607	7 0 48.3	11.881
15	12 15 0.67	1.8635	7 12 40.5	11.859
16	12 16 52.57	1.8663	7 24 31.4	11.838
17	12 18 44.63	1.8691	7 36 21.0	11.816
18	12 20 36.86	1.8720	7 48 9.3	11.793
19	12 22 29.27	1.8750	7 59 56.1	11.768
20	12 24 21.86	1.8780	8 11 41.4	11.743
21	12 26 14.63	1.8811	8 23 25.2	11.717
22	12 28 7.59	1.8843	8 35 7.4	11.691
23	12 30 0.74	1.8875	8 46 48.1	11.663
24	12 31 54.09	1.8908	−8 58 27.0	−11.635

NOVEMBER 11.

Hour.	Right Ascension. h m s	Var. per Min. s	Declination. ° ′ ″
0	12 31 54.09	1.8908	− 8 58 27.0
1	12 33 47.63	1.8940	9 10 4.3
2	12 35 41.37	1.8974	9 21 39.7
3	12 37 35.32	1.9008	9 33 13.4
4	12 39 29.47	1.9043	9 44 45.2
5	12 41 23.84	1.9079	9 56 15.1
6	12 43 18.42	1.9114	10 7 43.0
7	12 45 13.21	1.9150	10 19 8.9
8	12 47 8.22	1.9188	10 30 32.8
9	12 49 3.46	1.9225	10 41 54.5
10	12 50 58.92	1.9263	10 53 14.0
11	12 52 54.62	1.9302	11 4 31.3
12	12 54 50.54	1.9340	11 15 46.3
13	12 56 46.70	1.9380	11 26 59.0
14	12 58 43.10	1.9420	11 38 9.3
15	13 0 39.74	1.9460	11 49 17.1
16	13 2 36.62	1.9502	12 0 22.4
17	13 4 33.76	1.9543	12 11 25.1
18	13 6 31.14	1.9585	12 22 25.
19	13 8 28.78	1.9628	12 33 22.
20	13 10 26.67	1.9670	12 44 17.
21	13 12 24.82	1.9714	12 55 9.
22	13 14 23.24	1.9758	13 5 58.
23	13 16 21.92	1.9802	−13 16 44.

NOVEMBER 12.

Hour.	Right Ascension. h m s	Var. per Min. s	Declination. ° ′ ″
0	13 18 20.86	1.9846	−13 27 28.
1	13 20 20.07	1.9892	13 38 8.
2	13 22 19.56	1.9938	13 48 45.
3	13 24 19.32	1.9983	13 59 19.
4	13 26 19.36	2.0029	14 9 50.
5	13 28 19.67	2.0076	14 20 17.
6	13 30 20.27	2.0124	14 30 41.
7	13 32 21.16	2.0172	14 41 2.
8	13 34 22.33	2.0219	14 51 20.
9	13 36 23.79	2.0267	15 1 33.
10	13 38 25.53	2.0315	15 11 44.
11	13 40 27.57	2.0365	15 21 50.
12	13 42 29.91	2.0414	15 31 53.
13	13 44 32.54	2.0464	15 41 52.
14	13 46 35.48	2.0514	15 51 48.
15	13 48 38.71	2.0564	16 1 39.
16	13 50 42.25	2.0615	16 11 27.
17	13 52 46.09	2.0665	16 21 10.
18	13 54 50.23	2.0717	16 30 50.
19	13 56 54.69	2.0768	16 40 25.
20	13 58 59.45	2.0819	16 49 56.
21	14 1 4.52	2.0871	16 59 23.
22	14 3 9.90	2.0923	17 8 46.
23	14 5 15.60	2.0976	17 18 4.
24	14 7 21.61	2.1028	−17 27 17.

MEAN TIME.

GREENWICH MEAN TIME.

NOVEMBER 17.

Hour.	Right Ascension. h m s	Var. per Min. s	Declination. ° ′ ″	Var. per Min. ″
0	17 50 22.99	2.4519	−23 48 8.0	+2.482
1	17 52 50.10	2.4518	23 45 34.7	2.628
2	17 55 17.20	2.4515	23 42 52.6	2.775
3	17 57 44.28	2.4510	23 40 1.7	2.922
4	18 0 11.32	2.4505	23 37 2.0	3.068
5	18 2 38.34	2.4500	23 33 53.5	3.214
6	18 5 5.32	2.4493	23 30 36.3	3.359
7	18 7 32.25	2.4485	23 27 10.4	3.505
8	18 9 59.14	2.4477	23 23 35.7	3.651
9	18 12 25.97	2.4467	23 19 52.3	3.796
10	18 14 52.74	2.4456	23 16 0.2	3.940
11	18 17 19.44	2.4444	23 11 59.5	4.084
12	18 19 46.07	2.4433	23 7 50.1	4.228
13	18 22 12.63	2.4419	23 3 32.1	4.372
14	18 24 39.10	2.4405	22 59 5.5	4.515
15	18 27 5.49	2.4391	22 54 30.3	4.658
16	18 29 31.79	2.4375	22 49 46.6	4.799
17	18 31 57.99	2.4358	22 44 54.4	4.941
18	18 34 24.09	2.4341	22 39 53.7	5.082
19	18 36 50.08	2.4323	22 34 44.6	5.222
20	18 39 15.96	2.4304	22 29 27.1	5.363
21	18 41 41.73	2.4285	22 24 1.1	5.502
22	18 44 7.38	2.4264	22 18 26.9	5.639
23	18 46 32.90	2.4243	−22 12 44.4	+5.778

NOVEMBER 18.

Hour.	Right Ascension. h m s	Var. per Min. s	Declination. ° ′ ″	Var. per Min. ″
0	18 48 58.30	2.4222	−22 6 53.6	+5.915
1	18 51 23.56	2.4199	22 0 54.6	6.052
2	18 53 48.69	2.4177	21 54 47.4	6.188
3	18 56 13.68	2.4153	21 48 32.1	6.323
4	18 58 38.53	2.4129	21 42 8.6	6.458
5	19 1 3.23	2.4103	21 35 37.1	6.591
6	19 3 27.77	2.4078	21 28 57.7	6.724
7	19 5 52.16	2.4053	21 22 10.2	6.858
8	19 8 16.40	2.4026	21 15 14.8	6.988
9	19 10 40.47	2.3998	21 8 11.6	7.119
10	19 13 4.38	2.3972	21 1 0.5	7.249
11	19 15 28.13	2.3943	20 53 41.7	7.378
12	19 17 51.70	2.3914	20 46 15.2	7.506
13	19 20 15.10	2.3886	20 38 41.0	7.633
14	19 22 38.33	2.3857	20 30 59.2	7.759
15	19 25 1.38	2.3826	20 23 9.9	7.885
16	19 27 24.24	2.3796	20 15 13.0	8.010
17	19 29 46.93	2.3766	20 7 8.7	8.133
18	19 32 9.43	2.3735	19 58 57.0	8.256
19	19 34 31.75	2.3703	19 50 38.0	8.378
20	19 36 53.87	2.3672	19 42 11.7	8.498
21	19 39 15.81	2.3641	19 33 38.2	8.618
22	19 41 37.56	2.3608	19 24 57.6	8.737
23	19 43 59.11	2.3576	19 16 9.8	8.855
24	*19 46 20.47*	*2.3543*	−*19* 7 15.0	+8.972

NOVEMBER 19.

Hour.	Right Ascension. h m s	Var. per Min. s	Declination. ° ′ ″
0	19 46 20.47	2.3543	−19 7 15
1	19 48 41.63	2.3511	18 58 13
2	19 51 2.60	2.3478	18 49 4
3	19 53 23.36	2.3444	18 39 49
4	19 55 43.93	2.3412	18 30 26
5	19 58 4.30	2.3378	18 20 57
6	20 0 24.46	2.3344	18 11 22
7	20 2 44.43	2.3311	18 1 39
8	20 5 4.19	2.3277	17 51 50
9	20 7 23.75	2.3243	17 41 55
10	20 9 43.11	2.3210	17 31 54
11	20 12 2.27	2.3176	17 21 46
12	20 14 21.22	2.3142	17 11 31
13	20 16 39.97	2.3108	17 1 11
14	20 18 58.52	2.3074	16 50 44
15	20 21 16.86	2.3041	16 40 12
16	20 23 35.01	2.3008	16 29 33
17	20 25 52.95	2.2973	16 18 4[illegible]
18	20 28 10.69	2.2941	16 7 5[illegible]
19	20 30 28.24	2.2908	15 57 [illegible]
20	20 32 45.58	2.2874	15 46 [illegible]
21	20 35 2.73	2.2841	15 34 5[illegible]
22	20 37 19.67	2.2808	15 23 4[illegible]
23	20 39 36.43	2.2776	−15 12 2[illegible]

NOVEMBER 20.

Hour.	Right Ascension. h m s	Var. per Min. s	Declination. ° ′ ″
0	20 41 52.98	2.2743	−15 0 5[illegible]
1	20 44 9.34	2.2712	14 49 2[illegible]
2	20 46 25.52	2.2680	14 37 5[illegible]
3	20 48 41.50	2.2648	14 26 1[illegible]
4	20 50 57.29	2.2617	14 14 2[illegible]
5	20 53 12.90	2.2586	14 2 4[illegible]
6	20 55 28.32	2.2555	13 50 4[illegible]
7	20 57 43.56	2.2524	13 38 4[illegible]
8	20 59 58.61	2.2494	13 26 4[illegible]
9	21 2 13.49	2.2464	13 14 3[illegible]
10	21 4 28.18	2.2434	13 2 1[illegible]
11	21 6 42.70	2.2406	12 49 5[illegible]
12	21 8 57.05	2.2378	12 37 3[illegible]
13	21 11 11.23	2.2348	12 25 [illegible]
14	21 13 25.23	2.2321	12 12 3[illegible]
15	21 15 39.08	2.2293	11 59 5[illegible]
16	21 17 52.75	2.2266	11 47 1[illegible]
17	21 20 6.27	2.2239	11 34 3[illegible]
18	21 22 19.62	2.2213	11 21 4[illegible]
19	21 24 32.83	2.2188	11 8 5[illegible]
20	21 26 45.87	2.2162	10 55 5[illegible]
21	21 28 58.77	2.2138	10 42 5[illegible]
22	21 31 11.52	2.2113	10 29 5[illegible]
23	21 33 24.13	2.2089	10 16 4[illegible]
24	21 35 36.59	2.2066	−10 3 [illegible]

MEAN TIME.

[Rig]ht [Ascen]sion.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
NOVEMBER 21.					**NOVEMBER 23.**			
s	s	° ′ ″	″		h m s	s	° ′ ″	″
36.59	2.2066	−10 3 32.3	+13.223	0	23 19 57.57	2.1663	+ 1 15 13.6	+14.551
48.92	2.2043	9 50 17.2	13.281	1	23 22 7.57	2.1670	1 29 46.5	14.546
1.11	2.2020	9 36 58.6	[illegible]	2	23 24 17.61	2.1678	1 44 19.1	14.540
13.16	2.1998	9 23 36.6	13.394	3	23 26 27.71	[illegible]	1 58 51.3	14.532
25.05	2.1978	9 10 11.3	[illegible]	4	23 28 37.87	[illegible]	2 13 22 9	14.523
36.89	2.1957	8 56 42.7	13.503	5	23 30 48.08	[illegible]	2 27 54 0	14.512
48.57	2.1935	8 43 11.0	13.554	6	23 32 58.37	2.1720	2 42 24.4	14.499
0.14	2.1918	8 29 36.2	13.605	7	23 35 8.72	2.1732	2 56 53.9	14.486
11.58	2.1898	8 15 58.4	13.654	8	23 37 19.15	2.1744	3 11 22.7	14.472
22.91	2.1880	8 2 17.7	13.702	9	23 39 29.65	2.1757	3 25 50.5	14.455
34.14	2.1862	7 48 34.2	13.749	10	23 41 40.23	2.1771	3 40 17.3	14.438
45.25	2.1844	7 34 47.8	13.795	11	23 43 50.90	2.1786	3 54 43.1	14.419
56.27	[illegible]	7 20 58.8	13.838	12	23 46 1.66	2.1801	4 9 7.6	14.399
7.19	2.1812	7 7 7.2	13.882	13	23 48 12.51	2 1817	4 23 30.9	14 377
18.01	2.1797	6 53 13.0	[illegible]	14	23 50 23.46	2 1833	4 37 52.8	14 353
28.75	2.1782	6 39 16.4	13.963	15	23 52 34.51	[illegible]	4 52 13.2	14 328
39.39	2.1767	6 25 17.4	14.003	16	23 54 45.67	[illegible]	5 6 32.2	14 303
49.95	2.1754	6 11 16.1	14.040	17	23 56 56.93	2.1887	5 20 49.6	14.275
0.44	2.1741	5 57 12.6	14.077	18	23 59 8.31	2.1906	5 35 5.2	14.246
10.84	2.1728	5 43 6.9	14.112	19	0 1 19.80	2.1925	5 49 19.1	14.216
21.18	2.1716	5 28 59.2	14.146	20	0 3 31.41	2.1945	6 3 31.1	14.184
31.45	2.1706	5 14 49.4	14.178	21	0 5 43.14	2.1966	6 17 41.2	14.151
41.65	2.1695	5 0 37.8	14.209	22	0 7 55 00	2.1988	6 31 49.2	14.117
51.79	2.1686	− 4 46 24.3	+14.239	23	0 10 6 99	2.2009	+ 6 45 55 2	+14.081
NOVEMBER 22.					**NOVEMBER 24.**			
1.88	2.1678	− 4 32 9.1	+14.268	0	0 12 19.11	2.2032	+ 6 59 58.9	+14.043
11.92	2.1668	4 17 52.2	14.294	1	0 14 31.37	2.2054	7 14 0.3	14.004
21.90	2.1661	4 3 33.8	14.320	2	0 16 43 76	2.2078	7 27 59.4	13.964
31.85	2.1654	3 49 13.8	14.345	3	0 18 56 31	2.2103	7 41 56.0	13.923
41.75	2.1648	3 34 52.4	14.368	4	0 21 8 99	2.2127	7 55 50.1	13.879
51.62	2.1642	3 20 29.6	14.390	5	0 23 21.83	[illegible]	8 9 41.5	13.834
1.45	2.1637	3 6 5.6	14.410	6	0 25 34.82	2 2178	8 23 30 2	13.788
11.26	2.1632	2 51 40.4	14.430	7	0 27 47.97	[illegible]	8 37 16.1	13.741
21.04	2.1628	2 37 14.0	14.448	8	0 30 1.28	[illegible]	8 50 59.1	13 692
30.80	2.1625	2 22 46.7	14.464	9	0 32 14.75	[illegible]	9 4 39.1	13 642
40.54	2.1623	2 8 18.3	14.480	10	0 34 28.38	[illegible]	9 18 16.1	13.589
50.28	2.1622	1 53 49.1	14.493	11	0 36 42.18	[illegible]	9 31 49.8	13.536
0.00	2.1620	1 39 19.1	14.506	12	0 38 56 15	2.2343	9 45 20.4	13.482
9.72	[illegible]	1 24 48.4	14.518	13	0 41 10 29	2.2373	9 58 47.6	13.425
19.44	[illegible]	1 10 17.0	14.528	14	0 43 24 62	2.2403	10 12 11.4	13 368
29.17	[illegible]	0 55 45.1	14.536	15	0 45 39 12	[illegible]	10 25 31.8	13 309
[illegible]	2.1623	0 41 12.7	14.543	16	0 47 53 80	2 2462	10 38 48.5	13 248
[illegible]	2.1626	0 26 40.0	14.548	17	0 50 8.66	2.2493	10 52 1 5	13.186
[illegible]	2.1628	− 0 12 6.9	14.554	18	0 52 23.72	[illegible]	11 5 10 8	13.123
8.19	[illegible]	+ 0 2 26.5	14.557	19	0 54 38.96	[illegible]	11 18 16.2	13.058
18.00	2.1638	0 16 59.9	14.558	20	0 56 54 39	2.2588	11 31 17.7	12.992
27.84	2.1643	0 31 33.4	14.559	21	0 59 10 02	2.2621	11 44 15.2	12 924
37.71	[illegible]	0 46 7.0	14.558	22	1 1 25.84	2.2653	11 57 8.6	12.854
47.62	*2.1656*	*1 0 40.4*	*14.556*	23	1 3 41.85	2.2686	12 9 57.7	12.783
57.57	*2.1663*	*+ 1 15 13.6*	*+14.551*	24	1 5 58.07	2.2720	+12 22 42.6	+12.712

MEAN TIME.

MEAN TIME.

MEAN TIME.

MEAN TIME.

MEAN TIME.

N TIME.

Right Ascension.	Var. per Min.	Declination.	Var. per Min.
DECEMBER 17.			
h m s	s	° ′ ″	″
20 27 45.64	2.3453	−16 5 9.4	+11.143
20 30 6.24	2.3414	15 53 57.9	11.240
20 32 26.61	2.3374	15 42 40.6	11.337
20 34 46.73	2.3336	15 31 17.7	11.430
20 37 6.63	2.3296	15 19 49.0	11.523
20 39 26.28	2.3256	15 8 14.9	11.614
20 41 45.70	2.3218	14 56 35.3	11.705
20 44 4.89	2.3178	14 44 50.3	11.793
20 46 23.84	2.3138	14 33 0.1	11.881
20 48 42.55	2.3100	14 21 4.6	11.968
20 51 1.04	2.3063	14 9 4.0	12.052
20 53 19.30	2.3023	13 56 58.4	12.134
20 55 37.32	2.2985	13 44 47.9	[illegible]
20 57 55.12	2.2948	13 32 32.5	12.296
21 0 12.69	2.2909	13 20 12.4	12.374
21 2 30.03	2.2872	13 7 47.6	12.452
21 4 47.15	2.2835	12 55 18.2	12.528
21 7 4.06	2.2798	12 42 44.2	12.602
21 9 20.73	2.2763	12 30 5.9	12.675
21 11 37.20	2.2726	12 17 23.2	12.747
21 13 53.44	2.2689	12 4 36.3	[illegible]
21 16 9.47	2.2654	11 51 45.2	12.885
21 18 25.29	2.2620	11 38 50.1	12.953
21 20 40.91	2.2585	−11 25 50.9	+13.018
DECEMBER 18.			
21 22 56.31	2.2550	−11 12 47.9	+13.082
21 25 11.51	2.2517	10 59 41.1	13.145
21 27 26.51	2.2483	10 46 30.5	13.207
21 29 41.31	2.2450	10 33 16.3	13.266
21 31 55.91	2.2418	10 19 58.6	13.324
21 34 10.32	2.2385	10 6 37.4	[illegible]
21 36 24.53	2.2353	9 53 12.8	13.436
21 38 38.56	2.2323	9 39 44.9	13.491
21 40 52.40	2.2292	9 26 13 9	13.543
21 43 6.06	[illegible]	9 12 39.7	13.595
21 45 19.54	2.2232	8 59 2.5	13.644
21 47 32.84	2.2203	8 45 22.4	13.693
21 49 45.97	2.2174	8 31 39.4	13.739
21 51 58.93	2.2146	8 17 53.7	13.785
21 54 11.72	2.2118	8 4 5.2	[illegible]
21 56 24.35	2.2092	7 50 14.2	13.871
21 58 36.82	2.2065	7 36 20.7	13.914
22 0 49.13	2.2039	7 22 24.7	13.954
22 3 1.29	2.2014	7 8 26.4	13.990
22 5 13.30	2.1989	6 54 25.9	14.027
22 7 25.16	2.1965	6 40 23.2	14.063
22 9 36.88	2.1942	6 26 18.4	14.097
22 11 48.47	2.1919	6 12 11.6	14.129
22 13 59.91	2.1897	5 58 2.9	14.16
22 16 11.23	2.1876	− 5 43 52.3	+14.1

MEAN TIME.

MEAN TIME.

Hour	R. Asc. (cut off)		Var. per Min.	Declination.	Var. per Min.
	h m		s	° ′ ″	″
	DECEMBER 25				
	1 46	4	2.4122	+22 31 48.8	+5.239
	1 4	2	2.4136	22 36 59.0	5 102
	1 5	0	2 4154	22 42 1.0	4.963
	1 5	7	2.4170	22 46 54.6	4.824
	1 5	4	2.4184	22 51 39.9	4.685
	1 5	8	2.4198	22 56 16.8	4.545
	1 5	1	2.4211	23 0 45.3	4.404
	2	1	2.4223	23 5 5.3	4.263
	2	9	2.4234	23 9 16 9	4 123
	2	2	2.4244	23 13 20 0	3 981
10	2	2	2.4254	23 17 14.6	3.839
11	2 1	7	2.4263	23 21 0.7	3.697
12	2 1	7	2.4271	23 24 38.2	3.554
13	2 1	2	2.4278	23 28 7.2	3.412
14	2 1	0	2.4283	23 31 27.6	3.268
15	2 2	2	2.4288	23 34 39.4	3.125
16	2 2	6	2.4292	23 37 42.6	2.982
17	2 2	2	2 4295	23 40 37.2	2.838
18	2 2	0	2.4298	23 43 23.2	2.694
19	2 2	9	2.4299	23 46 0.5	2.550
20	2	9	2.4299	23 48 29.2	2 407
21	2	8	2.4298	23 50 49.3	2.262
22	2	6	2.4297	23 53 0.6	2.117
23	2	4	2.4294	+23 55 3.3	+1.973
	DECEMBER 26.				
0	2	9	2.4290	+23 56 57.4	+1.829
1	2	2	2.4286	23 58 42.8	1.684
2	2	2	2.4281	24 0 19.5	1.540
3	2	9	2.4274	24 1 47.6	1.396
4	2	1	2.4266	24 3 7.0	1 251
5	2	8	2.4258	24 4 17.7	1.107
6	2	0	2.4248	24 5 19.8	0.963
7	2	5	2.4238	24 6 13.3	0.819
8	3	5	2.4227	24 6 58.1	0.675
9	3	7	2 4213	24 7 34.3	0 532
10	3	1	2.4199	24 8 1.9	0.388
11	3	6	2.4185	24 8 20.9	0.245
12	3	3	2.4170	[illegible] 8 31.3	+0.103
13	3	0	2.4153	24 8 33.2	−0.040
14	3	7	2.4137	24 8 26.5	0 183
15	3	4	2.4118	24 8 11.2	0 325
16	3	9	2.4098	24 7 47.5	0.466
17	3	2	2 4078	24 7 15 3	0.607
18	3	3	2.4057	24 6 34 7	0.748
19	3	0	2.4034	24 5 45.5	0 889
20	3	4	2.4012	24 4 48.0	1.028
21	3	4	2 3988	24 3 42.1	1 168
22	3	9	2 3963	24 2 27.8	1.308
23	3	9	2.3937	24 1 5.2	1.446
24	3	13	2.3910	+23 59 34.3	−1.584

MEAN TIME.

GREENWICH MEAN TIME.

Right Ascension.	Var. per Min.	Declination.	Var. per Min.	Hour.	Right Ascension.	Var. per Min.	Declination.	Var. per Min.
DECEMBER 31.				DECEMBER 31.				
m s	s	° ′ ″	″		h m s	s	° ′ ″	″
4 24.27	1.9496	+12 57 41.7	−10.678	12	9 27 30.92	1.9034	+10 46 25.8	−11.178
6 21.12	1.9455	12 46 59.6	10.725	13	9 29 25.02	1.8999	10 35 14.0	11.214
8 17.73	1.9414	12 36 14.7	10.770	14	9 31 18.91	1.8964	10 24 0.1	11.249
10 14.09	1.9373	12 25 27.2	10.815	15	9 33 12.59	1.8931	10 12 44.1	11.283
12 10.21	1.9334	12 14 36.9	10.859	16	9 35 6.08	1.8898	10 1 26.1	11.318
14 6.10	1.9295	12 3 44.1	10.902	17	9 36 59.36	1.8863	9 50 6.0	11.351
16 1.75	1.9256	11 52 48.7	10.943	18	9 38 52.44	1.8832	9 38 44.0	11.383
17 57.17	1.9218	11 41 50.9	10.985	19	9 40 45.34	1.8800	9 27 20.1	11.414
19 52.36	1.9180	11 30 50.5	11.026	20	9 42 38.04	1.8768	9 15 54.3	11.444
21 47.33	1.9143	11 19 47.8	11.065	21	9 44 30.56	1.8738	9 4 26.8	11.474
23 42.08	1.9107	11 8 42.7	11.103	22	9 46 22.89	1.8707	8 52 57.4	11.503
25 36.61	1.9070	10 57 35.4	11.141	23	9 48 15.04	1.8678	8 41 26.4	11.531
27 30.92	1.9034	+10 46 25.8	−11.178	24	9 50 7.02	1.8648	+ 8 29 53.7	−11.558

PHASES OF THE MOON.

		d h m		d h m		d h m		d h m
Ioon	Jan.	7 19 42.0	Apr.	7 1 48.8	July	4 9 40.5	Sept.	30 8 31.1
uarter		15 23 42.1		14 8 12.0		11 0 11.9	Oct.	7 10 14.3
Ioon		22 19 40.0		21 2 1.3		18 15 0.1		15 14 41.0
Quarter		29 13 1.5		28 17 22.0		26 18 40.4		23 2 37.7
Ioon	Feb.	6 15 28.4	May	6 14 43.3	Aug.	2 17 10.9		29 18 19.2
uarter		14 13 53.2		13 13 47.9		9 7 56.4	Nov.	6 5 3.5
Ioon		21 6 9.0		20 12 46.8		17 6 21.0		14 6 28.5
Quarter		28 4 43.7		28 11 33.5		25 7 8.2		21 10 28.8
Ioon	Mar.	8 9 58.0	June	5 1 6.7	Sept.	1 0 28.5		28 6 41.3
uarter		16 0 33.1		11 18 38.5		7 19 5.2	Dec.	6 2 13.8
Ioon		22 16 5.0		19 1 2.2		15 22 27.5		13 21 17.3
Quarter		29 22 36.4		27 4 8.4		23 17 41.4		20 18 7.3
Ioon	Apr.	7 1 48.8	July	4 9 40.5		30 8 31.1		27 21 51.6
uarter		14 8 12.0		11 0 11.9	Oct.	7 10 14.3		

APOGEE.				PERIGEE.			
	d h		d h		d h		d h
	9 20.4	July	21 17.6	January	23 0.6	August	3 9.9
	5 20.7	August	18 0.5	February	20 13.3	August	31 19.9
	5 2.9	September	14 2.7	March	20 21.2	September	29 6.1
	1 19.2	October	11 12.5	April	17 15.2	October	27 10.8
	29 14.2	November	8 5.4	May	13 6.6	November	23 18.5
	27 9.4	December	6 2.3	June	8 8.2	December	18 10.2
	24 3.1			July	6 3.6		

GREENWICH MEAN TIME.

GREENWICH MEAN TIME.

M. T.	Longitude.	Latitude.	Semi-diameter.	Horizontal Parallax.	Var. per Hour.	Age.	Transit, Meridian of Greenwich.			Var. per Hour.
	° ′ ″	° ′ ″	′ ″	′ ″	″	d			h m	m
ı. 24.0	320 44 29.8	+2 42 57.9	16 43.4	61 16.68	−0.828	1.2	Jan. 24	U	1 19.0	2.30
24.5	328 18 41.4	3 17 21.3	16 40.1	61 4.41	1.210	1.7	24	L	13 46.2	2.23
25.0	335 49 29.8	3 48 2.9	16 35.5	60 47.80	1.548	2.2	25	U	2 12.6	2.17
25.5	343 15 53.5	4 14 32.7	16 30.0	60 27.48	1.830	2.7	25	L	14 38.4	2.12
26.0	350 37 0.2	4 36 29.7	16 23.6	60 4.12	2.052	3.2	26	U	3 3.6	2.09
26.5	357 52 8.4	+4 53 41.0	16 16.7	59 38.47	−2.213	3.7	26	L	15 28.5	2.06
27.0	5 0 48.5	5 6 1.1	16 9.2	59 11.25	2.314	4.2	27	U	3 53.2	2.05
27.5	12 2 41.9	5 13 31.7	16 1.6	58 43.14	2.360	4.7	27	L	16 17.8	2.05
28.0	18 57 40.9	5 16 19.7	15 53.9	58 14.80	2.355	5.2	28	U	4 42.4	2.06
28.5	25 45 47.1	5 14 36.6	15 46.2	57 46.80	2.306	5.7	28	L	17 7.2	2.07
29.0	32 27 10.6	+5 8 37.0	15 38.8	57 19.59	−2.224	6.2	29	U	5 32.1	2.09
29.5	39 2 8.7	4 58 37.9	15 31.7	56 53.54	2.113	6.7	29	L	17 57.3	2.11
30.0	45 31 3.6	4 44 57.8	15 25.0	56 28.98	1.978	7.2	30	U	6 22.8	2.13
30.5	51 54 21.6	4 27 56.1	15 18.8	56 6.14	1.828	7.7	30	L	18 48.5	2.15
31.0	58 12 32.0	4 7 52.4	15 13.1	55 45.15	1.669	8.2	31	U	7 14.4	2.16
31.5	64 26 5.7	+3 45 6.7	15 7.9	55 26.10	−1.504	8.7	31	L	19 40.3	2.17
b. 1.0	70 35 34.2	3 19 59.0	15 3.2	55 9.05	1.338	9.2	Feb. 1	U	8 6.3	2.16
1.5	76 41 29.3	2 52 49.0	14 59.1	54 53.98	1.172	9.7	1	L	20 32.2	2.14
2.0	82 44 21.7	2 23 56.3	14 55.6	54 40.89	1.011	10.2	2	U	8 57.8	2.12
2.5	88 44 41.4	1 53 40.4	14 52.5	54 29.69	0.857	10.7	2	L	21 23.1	2.09
3.0	94 42 56.4	+1 22 21.0	14 49.9	54 20.30	−0.709	11.2	3	U	9 48.0	2.05
3.5	100 39 33.6	0 50 17.5	14 47.9	54 12.64	0.568	11.7	3	L	22 12.3	2.00
4.0	106 34 57.2	+0 17 49.3	14 46.2	54 6.64	0.435	12.2	4	U	10 36.1	1.95
4.5	112 29 30.1	−0 14 44.3	14 45.0	54 2.18	0.309	12.7	4	L	22 59.2	1.91
5.0	118 23 32.8	0 47 3.9	14 44.2	53 59.19	0.191	13.2	5	U	11 21.8	1.86
5.5	124 17 24.4	−1 18 50.2	14 43.8	53 57.57	−0.079	13.7	5	L	23 43.8	1.81
6.0	130 11 22.4	1 49 44.3	14 43.7	53 57.28	+0.030	14.2	6	U	12 5.4	1.77
6.5	136 5 42.6	2 19 27.5	14 43.9	53 58.27	0.135	14.7			. . . . .	. . .
7.0	142 0 39.9	2 47 41.7	14 44.6	54 0.51	0.238	15.2	7	L	0 26.4	1.74
7.5	147 56 28.4	3 14 9.3	14 45.5	54 3.99	0.342	15.7	7	U	12 47.2	1.71
8.0	153 53 21.4	−3 38 33.3	14 46.8	54 8.73	+0.448	16.2	8	L	1 7.6	1.69
8.5	159 51 32.3	4 0 37.8	14 48.4	54 14.74	0.555	16.7	8	U	13 27.9	1.69
9.0	165 51 14.5	4 20 7.8	14 50.4	54 22.07	0.667	17.2	9	L	1 48.1	1.69
9.5	171 52 41.9	4 36 49.3	14 52.8	54 30.78	0.785	17.7	9	U	14 8.4	1.70
10.0	177 56 9.1	4 50 29.6	14 55.6	54 40.94	0.908	18.2	10	L	2 28.9	1.71
10.5	184 1 51.8	−5 0 57.2	14 58.8	54 52.59	+1.035	18.7	10	U	14 49.6	1.74
11.0	190 10 7.0	5 8 2.0	15 2.4	55 5.81	1.168	19.2	11	L	3 10.8	1.78
11.5	196 21 13.0	5 11 35.2	15 6.4	55 20.65	1.305	19.7	11	U	15 32.5	1.84
12.0	202 35 29.4	5 11 29.5	15 10.9	55 37.14	1.444	20.2	12	L	3 55.0	1.90
12.5	208 53 17.0	5 7 39.3	15 15.8	55 55.31	1.583	20.7	12	U	16 18.2	1.97
13.0	215 14 57.6	−5 0 0.6	15 21.2	56 15.13	+1.719	21.2	13	L	4 42.3	2.05
13.5	221 40 53.9	4 48 31.7	15 27.1	56 36.53	1.847	21.7	13	U	17 7.4	2.14
14.0	228 11 28.3	4 33 12.6	15 33.3	56 59.40	1.963	22.2	14	L	5 33.6	2.23
14.5	234 47 2.7	4 14 6.1	15 39.9	57 23.57	2.062	22.7	14	U	18 0.8	2.31
15.0	241 27 57.7	3 51 18.0	15 46.8	57 48.78	2.137	23.2	15	L	6 29.1	2.40
15.5	248 14 31.4	−3 24 57.6	15 53.8	58 14.73	+2.183	23.7	15	U	18 58.3	2.47
16.0	255 6 58.1	−2 55 18.3	16 1.0	58 41.02	+2.191	24.2	16	L	7 28.3	2.53

GREENWICH MEAN TIME.

GREENWICH MEAN TIME.

M. T.	Longitude.	Latitude.	Semi-diameter.	Horizontal Parallax.	Var. per Hour.	Age.	Transit, Meridian of Greenwich.			Var. per Hour.
	° ′ ″	° ′ ″	′ ″	′ ″	″	d			h m	m
r. 10.0	187 10 55.3	−4 58 15.3	15 2.3	55 5.49	+0.982	16.7	Mar. 10	L	1 10.1	1.75
10.5	193 23 32.5	5 2 31.4	15 5.6	55 17.70	1.053	17.2	10	U	13 31.7	1.82
11.0	199 38 46.4	5 3 11.7	15 9.1	55 30.76	1.124	17.7	11	L	1 53.9	1.87
11.5	205 56 42.1	5 0 11.4	15 12.9	55 44.67	1.195	18.2	11	U	14 16.7	1.93
12.0	212 17 25.3	4 53 28.0	15 17.0	55 59.43	1.266	18.7	12	L	2 40.3	2.00
12.5	218 41 3.4	−4 43 1.4	15 21.2	56 15.05	+1.338	19.2	12	U	15 4.7	2.07
13.0	225 7 44.6	4 28 53.9	15 25.7	56 31.53	1.409	19.7	13	L	3 30.1	2.15
13.5	231 37 38.7	4 11 11.0	15 30.4	56 48.85	1.478	20.2	13	U	15 56.4	2.23
14.0	238 10 57.0	3 50 0.4	15 35.4	57 6.97	1.541	20.7	14	L	4 23.6	2.30
14.5	244 47 52.3	3 25 32.9	15 40.5	57 25.80	1.597	21.2	14	U	16 51.5	2.36
15.0	251 28 37.8	−2 58 2.4	15 45.8	57 45.25	+1.643	21.7	15	L	5 20.2	2.41
15.5	258 13 26.9	2 27 46.0	15 51.2	58 5.16	1.673	22.2	15	U	17 49.5	2.45
16.0	265 2 32.4	1 55 4.2	15 56.7	58 25.32	1.682	22.7	16	L	6 19.0	2.47
16.5	271 56 5.4	1 20 20.5	16 2.2	58 45.44	1.667	23.2	16	U	18 48.7	2.47
17.0	278 54 14.0	0 44 2.4	16 7.6	59 5.20	1.622	23.7	17	L	7 18.3	2.46
17.5	285 57 2.1	−0 6 40.7	16 12.8	59 24.23	+1.544	24.2	17	U	19 47.6	2.43
18.0	293 4 27.8	+0 31 10.3	16 17.6	59 42.09	1.426	24.7	18	L	8 16.4	2.38
18.5	300 16 22.3	1 8 53.5	16 22.0	59 58.28	1.267	25.2	18	U	20 44.8	2.33
19.0	307 32 28.4	1 45 49.4	16 25.9	60 12.32	1.067	25.7	19	L	9 12.6	2.29
19.5	314 52 20.0	2 21 17.2	16 29.0	60 23.72	0.827	26.2	19	U	21 39.8	2.25
20.0	322 15 21.1	+2 54 35.7	16 31.2	60 32.03	+0.553	26.7	20	L	10 6.5	2.21
20.5	329 40 46.1	3 25 5.3	16 32.6	60 36.85	+0.248	27.2	20	U	22 32.8	2.18
21.0	337 7 41.0	3 52 9.0	16 32.8	60 37.88	−0.079	27.7	21	L	10 58.8	2.16
21.5	344 35 4.9	4 15 14.7	16 32.0	60 34.91	0.416	28.2	21	U	23 24.6	2.14
22.0	352 1 51.7	4 33 56.0	16 30.1	60 27.91	0.751	28.7			. . . . .	. . .
22.5	359 26 53.6	+4 47 54.0	16 27.1	60 16.98	−1.070	29.2	22	L	11 50.4	2.14
23.0	6 49 3.4	4 56 57.5	16 23.2	60 2.32	1.367	0.3	23	U	0 16.1	2.15
23.5	14 7 18.3	5 1 3.0	16 18.2	59 44.31	1.628	0.8	23	L	12 42.0	2.16
24.0	21 20 42.0	5 0 15.1	16 12.6	59 23.42	1.848	1.3	24	U	1 8.0	2.18
24.5	28 28 27.2	4 54 45.0	16 6.2	59 0.16	2.020	1.8	24	L	13 34.4	2.21
25.0	35 29 57.1	+4 44 49.8	15 59.4	58 35.15	−2.139	2.3	25	U	2 1.0	2.24
25.5	42 24 46.3	4 30 50.8	15 52.3	58 9.01	2.208	2.8	25	L	14 27.9	2.26
26.0	49 12 40.9	4 13 12.5	15 45.0	57 42.33	2.231	3.3	26	U	2 55.0	2.27
26.5	55 53 38.1	3 52 20.7	15 37.7	57 15.67	2.205	3.8	26	L	15 22.3	2.27
27.0	62 27 45.1	3 28 42.6	15 30.6	56 49.59	2.136	4.3	27	U	3 49.6	2.27
27.5	68 55 18.1	+3 2 44.5	15 23.8	56 24.54	−2.033	4.8	27	L	16 16.7	2.26
28.0	75 16 40.8	2 34 52.3	15 17.4	56 0.92	1.899	5.3	28	U	4 43.7	2.23
28.5	81 32 23.0	2 5 30.5	15 11.4	55 39.07	1.739	5.8	28	L	17 10.3	2.20
29.0	87 42 59.3	1 35 2.3	15 6.0	55 19.26	1.560	6.3	29	U	5 36.3	2.15
29.5	93 49 7.5	1 3 49.5	15 1.2	55 1.70	1.365	6.8	29	L	18 1.8	2.10
30.0	99 51 27.9	+0 32 12.4	14 57.1	54 46.55	−1.160	7.3	30	U	6 26.7	2.04
30.5	105 50 41.9	+0 0 29.9	14 53.6	54 33.89	0.949	7.8	30	L	18 50.8	1.98
31.0	111 47 31.5	−0 30 59.8	14 50.9	54 23.78	0.736	8.3	31	U	7 14.3	1.93
31.5	117 42 38.0	1 1 59.5	14 48.8	54 16.22	0.524	8.8	31	L	19 37.2	1.88
1.0	123 36 41.9	1 32 12.4	14 47.5	54 11.18	0.316	9.3	Apr. 1	U	7 59.4	1.83
1.5	129 30 22.1	−2 1 22.6	14 46.8	54 8.61	−0.114	9.8	1	L	20 21.1	1.79
2.0	135 24 15.4	−2 29 13.9	14 46.7	54 8.39	+0.076	10.3	2	U	8 42.4	1.76

GREENWICH MEAN TIME.

G. M. T		Longitude.
		° ′ ″
Apr	1.0	123 36 41.9
	1.5	129 30 22.1
	2.0	135 24 15.4
	2.5	141 18 56.0
	3.0	147 14 55.0
	3.5	153 12 40.5
	4.0	159 12 36.9
	4.5	165 15 4.9
	5.0	171 20 21.0
	5.5	177 28 38.1
	6.0	183 40 5.0
	6.5	189 54 47.0
	7.0	196 12 46.0
	7.5	202 34 0.6
	8.0	208 58 27.4
	8.5	215 26 1.0
	9.0	221 56 35.0
	9.5	228 30 2.8
	10.0	235 6 17.9
	10.5	241 45 14.7
	11.0	248 26 49.3
	11.5	255 10 59.0
	12.0	261 57 43.3
	12.5	268 47 2.9
	13.0	275 38 59.8
	13.5	282 33 36.7
	14.0	289 30 56.1
	14.5	296 30 59.3
	15.0	303 33 44.9
	15.5	310 39 8.7
	16.0	317 47 1.9
	16.5	324 57 10.1
	17.0	332 9 12.8
	17.5	339 22 43.2
	18.0	346 37 7.9
	18.5	353 51 47.6
	19.0	1 5 58.3
	19.5	8 18 52.6
	20.0	15 29 41.8
	20.5	22 37 37.8
	21.0	29 41 55.2
	21.5	36 41 53.0
	22.0	43 36 56.8
	22.5	50 26 39.7
	23.0	57 10 42.9
	23.5	63 48 56.4
	24.0	70 21 18.3

ME.

GREENWICH MEAN TIME.

G. M. T.		Longitu	
		°	′
May	17.0	11	5
	17.5	18	4
	18.0	25	1
	18.5	31	55
	19.0	38	46
	19.5	45	34
	20.0	52	18
	20.5	58	57
	21.0	65	32
	21.5	72	3
	22.0	78	29
	22.5	84	50
	23.0	91	8
	23.5	97	21
	24.0	103	30
	24.5	109	35
	25.0	115	38
	25.5	121	38
	26.0	127	36
	26.5	133	32
	27.0	139	27
	27.5	145	23
	28.0	151	18
	28.5	157	14
	29.0	163	12
	29.5	169	12
	30.0	175	15
	30.5	181	21
	31.0	187	31
	31.5	193	45
June	1.0	200	3
	1.5	206	27
	2.0	212	56
	2.5	219	30
	3.0	226	9
	3.5	232	54
	4.0	239	44
	4.5	246	38
	5.0	253	37
	5.5	260	39
	6.0	267	45
	6.5	274	54
	7.0	282	5
	7.5	289	18
	8.0	296	31
	8.5	303	45
	9.0	310	59

GREENWICH MEAN TIME.

...	Transit, Meridian of Greenwich.			Var. per Hour.
			h m	m
5	June 9	L	3 50.0	2.24
0	9	U	16 16.5	2.18
5	10	L	4 42.2	2.13
0	10	U	17 7.4	2.08
5	11	L	5 32.2	2.05
0	11	U	17 56.6	2.03
5	12	L	6 20.9	2.02
0	12	U	18 45.2	2.03
5	13	L	7 9.6	2.04
0	13	U	19 34.2	2.07
5	14	L	7 59.2	2.10
0	14	U	20 24.6	2.13
5	15	L	8 50.4	2.17
0	15	U	21 16.7	2.21
5	16	L	9 43.4	2.24
0	16	U	22 10.4	2.26
5	17	L	10 37.6	2.27
0	17	U	23 4.8	2.27
5	18	L	11 31.9	2.26
0	18	U	23 58.7	2.22
5			....	...
5	19	L	12 25.0	2.17
0	20	U	0 50.7	2.11
5	20	L	13 15.7	2.06
0	21	U	1 40.0	2.00
5	21	L	14 3.6	1.93
0	22	U	2 26.4	1.87
5	22	L	14 48.5	1.82
0	23	U	3 10.1	1.77
5	23	L	15 31.1	1.73
0	24	U	3 51.7	1.71
5	24	L	16 12.0	1.69
0	25	U	4 32.2	1.68
5	25	L	16 52.3	1.68
0	26	U	5 12.5	1.69
5	26	L	17 32.9	1.71
0	27	U	5 53.6	1.75
5	27	L	18 14.9	1.79
0	28	U	6 36.8	1.85
5	28	L	18 59.4	1.93
0	29	U	7 23.0	2.01
5	29	L	19 47.6	2.09
0	30	U	8 13.2	2.18
5	30	L	20 40.1	2.27
0	July 1	U	9 8.0	2.37
5	1	L	21 37.0	2.46
0	2	U	10 6.9	2.52

GREENWICH MEAN TIME.

MEAN TIME.

Var. per Hour.
m
1.70
1.73
1.78
1.83
1.89
1.96
2.05
2.14
2.23
2.31
2.40
2.47
2.52
2.56
2.56
2.55
2.52
2.47
2.41
. . .
2.36
2.30
2.25
2.21
2.18
2.15
2.14
2.14
2.15
2.16
2.18
2.20
2.22
2.23
2.24
2.24
2.23
2.21
2.18
2.14
2.10
2.04
1.99
1.93
1.88
1.83
1.79

GREENWICH MEAN TIME.

G. M. T.		Longitude.	Latitude.	Semi-diameter.	Horizontal Parallax.	Var. per Hour.	Age.	Transit, Meridian of Greenwic		
		° ′ ″	° ′ ″	′ ″	′ ″	″	d			h
Aug.	16.0	129 15 20.7	−2 30 36.8	14 46.1	54 6.27	−0.449	28.4	Aug. 16	L	11 2
	16.5	135 11 7.8	2 57 42.4	14 44.8	54 1.55	0.338	28.9	16	U	23 4
	17.0	141 6 24.7	3 22 47.9	14 43.9	53 58.15	0.227	29.4			. . .
	17.5	147 1 25.4	3 45 39.1	14 43.4	53 56.11	0.115	0.2	17	L	12
	18.0	152 56 23.4	4 6 2.5	14 43.2	53 55.38	−0.004	0.7	18	U	0 2
	18.5	158 51 31.8	−4 23 45.9	14 43.3	53 56.02	+0.112	1.2	18	L	12 4
	19.0	164 47 3.6	4 38 38.7	14 43.9	53 58.10	0.234	1.7	19	U	1
	19.5	170 43 12.4	4 50 31.5	14 44.9	54 1.65	0.359	2.2	19	L	13 2
	20.0	176 40 12.4	4 59 16.3	14 46.2	54 6.75	0.492	2.7	20	U	1 4
	20.5	182 38 19.0	5 4 46.7	14 48.1	54 13.48	0.631	3.2	20	L	14 1
	21.0	188 37 49.3	−5 6 57.5	14 50.4	54 21.92	+0.777	3.7	21	U	2 3
	21.5	194 39 1.8	5 5 45.1	14 53.2	54 32.15	0.929	4.2	21	L	14 5
	22.0	200 42 17.0	5 1 7.3	14 56.5	54 44.25	1.087	4.7	22	U	3 1
	22.5	206 47 57.4	4 53 3.1	15 0.3	54 58.27	1.249	5.2	22	L	15 3
	23.0	212 56 27.4	4 41 33.2	15 4.6	55 14.25	1.415	5.7	23	U	3 5
	23.5	219 8 13.2	−4 26 39.7	15 9.5	55 32.22	+1.580	6.2	23	L	16 2
	24.0	225 23 42.3	4 8 26.5	15 15.0	55 52.15	1.740	6.7	24	U	4 4
	24.5	231 43 23.4	3 46 59.3	15 20.9	56 13.96	1.893	7.2	24	L	17 1
	25.0	238 7 45.6	3 22 26.0	15 27.4	56 37.54	2.034	7.7	25	U	5 3
	25.5	244 37 17.9	2 54 57.1	15 34.2	57 2.70	2.157	8.2	25	L	18
	26.0	251 12 27.6	−2 24 45.8	15 41.4	57 29.20	+2.255	8.7	26	U	6 3
	26.5	257 53 39.9	1 52 8.8	15 48.9	57 56.71	2.322	9.2	26	L	19
	27.0	264 41 16.0	1 17 26.7	15 56.6	58 24.79	2.351	9.7	27	U	7 3
	27.5	271 35 32.0	0 41 4.1	16 4.3	58 52.96	2.335	10.2	27	L	20
	28.0	278 36 36.6	−0 3 30.1	16 11.8	59 20.64	2.269	10.7	28	U	8 3
	28.5	285 44 29.9	+0 34 41.6	16 19.0	59 47.19	+2.146	11.2	28	L	21
	29.0	292 59 1.7	1 12 53.0	16 25.8	60 11.91	1.965	11.7	29	U	9 3
	29.5	300 19 49.7	1 50 22.6	16 31.8	60 34.10	1.724	12.2	29	L	22
	30.0	307 46 19.1	2 26 26.0	16 37.0	60 53.06	1.428	12.7	30	U	10 2
	30.5	315 17 42.2	3 0 17.9	16 41.1	61 8.14	1.078	13.2	30	L	22 5
	31.0	322 52 58.9	+3 31 13.9	16 44.0	61 18.79	+0.691	13.7	31	U	11 2
	31.5	330 30 58.1	3 58 32.5	16 45.6	61 24.63	+0.278	14.2	31	L	23 5
Sept.	1.0	338 10 20.6	4 21 37.2	16 45.8	61 25.42	−0.149	14.7	Sept. 1	U	12 1
	1.5	345 49 41.8	4 39 58.5	16 44.6	61 21.09	0.571	15.2			. . .
	2.0	353 27 36.2	4 53 15.5	16 42.1	61 11.79	0.974	15.7	2	L	0 4
	2.5	1 2 40.9	+5 1 16.6	16 38.3	60 57.85	−1.342	16.2	2	U	13 1
	3.0	8 33 39.7	5 3 59.8	16 33.4	60 39.77	1.663	16.7	3	L	1 3
	3.5	15 59 25.9	5 1 31.6	16 27.5	60 18.15	1.931	17.2	3	U	14
	4.0	23 19 5.1	4 54 6.5	16 20.8	59 53.66	2.140	17.7	4	L	2 3
	4.5	30 31 56.3	4 42 5.2	16 13.5	59 27.02	2.289	18.2	4	U	14 5
	5.0	37 37 32.7	+4 25 52.9	16 5.9	58 58.97	−2.377	18.7	5	L	3 2
	5.5	44 35 40.5	4 5 57.9	15 58.0	58 30.19	2.410	19.2	5	U	15 5
	6.0	51 26 18.4	3 42 49.8	15 50.2	58 1.32	2.394	19.7	6	L	4 2
	6.5	58 9 35.9	3 16 58.8	15 42.4	57 32.90	2.336	20.2	6	U	16 4
	7.0	64 45 51.2	2 48 54.4	15 35.0	57 5.41	2.242	20.7	7	L	5 1
	7.5	71 15 29.9	+2 19 4.9	15 27.8	56 39.22	−2.119	21.2	7	U	17 4
	8.0	77 39 2.4	+1 47 57.3	15 21.1	56 14.64	−1.974	21.7	8	L	6 1

GREENWICH MEAN TIME.

GREENWICH MEAN TIME.

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GREENWICH MEAN TIME.

M. T.	Longitude.	Latitude.	Semi-diameter.	Horizontal Parallax.	Var. per Hour.	Age.	Transit, Meridian of Greenwich.			Var. per Hour.
	° ′ ″	° ′ ″	′ ″	′ ″	″	d			h m	m
24.0	312 5 19.6	+3 9 35.3	16 10.0	59 14.06	+1.324	8.4	Oct. 24	U	7 0.1	2.18
24.5	319 11 21.9	3 37 38.6	16 14.2	59 29.40	1.227	8.9	24	L	19 26.1	2.16
25.0	326 21 34.6	4 2 32.9	16 18.0	59 43.39	1.098	9.4	25	U	7 51.9	2.14
25.5	333 35 39.6	4 23 47.7	16 21.3	59 55.61	0.934	9.9	25	L	20 17.6	2.13
26.0	340 53 10.1	4 40 55.7	16 24.1	60 5.67	0.735	10.4	26	U	8 43.2	2.13
26.5	348 13 30.4	+4 53 33.4	16 26.1	60 13.14	+0.504	10.9	26	L	21 8.9	2.15
27.0	355 35 56.0	5 1 22.4	16 27.3	60 17.67	+0.248	11.4	27	U	9 34.7	2.17
27.5	2 59 34.4	5 4 11.1	16 27.7	60 18.99	−0.031	11.9	27	L	22 1.0	2.20
28.0	10 23 27.9	5 1 54.6	16 27.1	60 16.86	0.325	12.4	28	U	10 27.6	2.24
28.5	17 46 34.5	4 54 35.9	16 25.6	60 11.16	0.626	12.9	28	L	22 54.6	2.28
29.0	25 7 51.0	+4 42 25.3	16 23.0	60 1.87	−0.919	13.4	29	U	11 22.3	2.32
29.5	32 26 16.2	4 25 40.5	16 19.6	59 49.18	1.194	13.9	29	L	23 50.4	2.36
30.0	39 40 53.3	4 4 45.4	16 15.2	59 33.30	1.447	14.4	30	U	12 18.9	2.39
30.5	46 50 51.5	3 40 9.1	16 10.1	59 14.57	1.667	14.9			. . . . .	. . .
31.0	53 55 28.8	3 12 24.2	16 4.4	58 53.44	1.847	15.4	31	L	0 47.7	2.41
31.5	60 54 12.9	+2 42 5.6	15 58.1	58 30.42	−1.983	15.9	31	U	13 16.8	2.42
v. 1.0	67 46 41.8	2 9 48.6	15 51.5	58 6.05	2.072	16.4	Nov. 1	L	1 45.7	2.41
1.5	74 32 43.5	1 36 8.0	15 44.6	57 40.89	2.116	16.9	1	U	14 14.5	2.38
2.0	81 12 16.1	1 1 37.3	15 37.7	57 15.46	2.114	17.4	2	L	2 42.8	2.33
2.5	87 45 26.4	+0 26 47.5	15 30.8	56 50.33	2.069	17.9	2	U	15 10.5	2.27
3.0	94 12 29.4	−0 7 52.9	15 24.2	56 25.95	−1.988	18.4	3	L	3 37.4	2.21
3.5	100 33 47.0	0 41 58.6	15 17.9	56 2.77	1.872	18.9	3	U	16 3.5	2.14
4.0	106 49 46.5	1 15 6.9	15 12.0	55 41.14	1.728	19.4	4	L	4 28.7	2.06
4.5	113 0 59.3	1 46 57.7	15 6.6	55 21.39	1.561	19.9	4	U	16 53.0	1.99
5.0	119 8 0.5	2 17 13.6	15 1.8	55 3.75	1.376	20.4	5	L	5 16.4	1.92
5.5	125 11 27.5	−2 45 39.1	14 57.6	54 48.44	−1.175	20.9	5	U	17 39.1	1.86
6.0	131 11 58.7	3 12 0.8	14 54.1	54 35.60	0.963	21.4	6	L	6 1.1	1.81
6.5	137 10 13.5	3 36 6.3	14 51.3	54 25.34	0.747	21.9	6	U	18 22.5	1.76
7.0	143 6 50.9	3 57 44.5	14 49.2	54 17.67	0.530	22.4	7	L	6 43.4	1.73
7.5	149 2 29.3	4 16 45.5	14 47.9	54 12.63	0.310	22.9	7	U	19 4.0	1.70
8.0	154 57 46.2	−4 33 0.0	14 47.2	54 10.20	−0.097	23.4	8	L	7 24.3	1.69
8.5	160 53 16.6	4 46 19.1	14 47.2	54 10.27	+0.107	23.9	8	U	19 44.5	1.68
9.0	166 49 34.2	4 56 35.0	14 47.9	54 12.75	0.304	24.4	9	L	8 4.7	1.69
9.5	172 47 9.7	5 3 40.3	14 49.2	54 17.52	0.488	24.9	9	U	20 25.1	1.71
10.0	178 46 30.8	5 7 28.5	14 51.1	54 24.41	0.659	25.4	10	L	8 45.8	1.73
10.5	184 48 2.1	−5 7 53.9	14 53.5	54 33.25	+0.813	25.9	10	U	21 6.7	1.77
11.0	190 52 4.7	5 4 52.2	14 56.4	54 43.84	0.947	26.4	11	L	9 28.1	1.81
11.5	196 58 56.4	4 58 20.4	14 59.6	54 55.91	1.062	26.9	11	U	21 50.2	1.87
12.0	203 8 50.9	4 48 17.5	15 3.3	55 9.26	1.159	27.4	12	L	10 13.0	1.93
12.5	209 21 58.4	4 34 44.7	15 7.2	55 23.64	1.233	27.9	12	U	22 36.6	2.00
13.0	215 38 25.6	−4 17 45.6	15 11.3	55 38.78	+1.286	28.4	13	L	11 0.9	2.07
13.5	221 58 15.8	3 57 26.6	15 15.6	55 54.44	1.321	28.9	13	U	23 26.1	2.14
14.0	228 21 29.3	3 33 57.4	15 20.0	56 10.41	1.336	29.4			. . . . .	. . .
14.5	234 48 3.9	3 7 30.8	15 24.3	56 26.42	1.331	0.2	14	L	11 52.2	2.21
15.0	241 17 55.4	2 38 22.8	15 28.6	56 42.29	1.311	0.7	15	U	0 19.0	2.27
15.5	247 50 57.8	−2 6 53.1	15 32.9	56 57.84	+1.278	1.2	15	L	12 46.6	2.32
16.0	254 27 4.4	−1 33 24.3	15 37.0	57 12.92	+1.233	1.7	16	U	1 14.6	2.35

GREENWIC

Date.		Apparent Right Ascension. Noon.	Var. per Hour. Noon.	Apparent Declination. Noon.
		h m s	s	° ′ ″
Jan.	1	20 8 54.66	+11.874	−21 30 48.2
	2	20 13 28.72	10.946	21 6 26.3
	3	20 17 39.05	9.895	20 41 46.3
	4	20 21 22.61	8.713	20 17 3.3
	5	20 24 36.17	7.394	19 52 34.5
	6	20 27 16.37	+ 5.933	−19 28 38.9
	7	20 29 19.82	4.331	19 5 36.6
	8	20 30 43.18	2.595	18 43 48.9
	9	20 31 23.42	+ 0.741	18 23 37.3
	10	20 31 18.02	− 1.294	18 5 22.8
	11	20 30 25.18	− 3.204	−17 49 24.8
	12	20 28 44.22	5.205	17 35 59.7
	13	20 26 15.80	7.147	17 25 20.1
	14	20 23 2.20	8.957	17 17 33.7
	15	20 19 7.50	10.560	17 12 42.3
	16	20 14 37.56	−11.882	−17 10 41.6
	17	20 9 39.92	12.860	17 11 22.0
	18	20 4 23.41	13.440	17 14 28.8
	19	19 58 57.65	13.629	17 19 44.0
	20	19 53 32.43	13.407	17 26 47.8
	21	19 48 17.09	−12.813	−17 35 19.7
	22	19 43 19.99	11.896	17 45 0.4
	23	19 38 48.13	10.720	17 55 31.7
	24	19 34 46.90	9.355	18 6 37.7
	25	19 31 20.11	7.863	18 18 4.3
	26	19 28 30.01	− 6.305	−18 29 30.5
	27	19 26 17.62	4.729	18 41 13.0
	28	19 24 42.83	3.176	18 52 35.6
	29	19 23 44.76	1.674	19 3 39.5
	30	19 23 21.92	− 0.242	19 14 17.8
	31	19 23 32.45	1.105	−19 24 24.4
Feb.	1	19 24 14.25	2.303	19 33 53.7
	2	19 25 25.14	3.529	19 42 40.9
	3	19 27 2.92	4.604	19 50 41.4
	4	19 29 5.44	5.592	19 57 51.5
	5	19 31 30.64	+ 6.495	−20 4 7.7
	6	19 34 16.58	7.321	20 9 26.7
	7	19 37 21.46	8.074	20 13 45.8
	8	19 40 43.60	8.761	20 17 2.4
	9	19 44 21.48	9.396	20 19 14.4
	10	19 48 13.70	+ 9.956	−20 20 20.0
	11	19 52 18.98	10.475	20 20 17.2
	12	19 56 36.14	10.948	20 19 4.6
	13	20 1 4.16	11.380	20 16 41.1
	14	20 5 42.05	11.772	20 13 5.8
	15	20 10 28.96	+12.131	−20 8 16.5
	16	20 15 24.11	+12.450	−20 2 13.6

Var. per Hour. Noon.	Semi-diameter. Noon.	Hor. Parallax. Noon.	Transit, Meridian of Greenwich.
	″	″	h m
+2580.1	3.20	8.42	22 32.8
2490.5	3.15	8.30	22 34.0
2401.6	3.11	8.19	22 35.3
2316.2	3.06	8.08	22 36.8
2234.6	3.03	7.98	22 38.3
+2153.6	2.99	7.88	22 39.8
2076.1	2.96	7.79	22 41.5
2001.0	2.92	7.71	22 43.2
1928.2	2.89	7.62	22 45.0
1857.7	2.86	7.54	22 46.9
+1790.2	2.84	7.47	22 48.8
1722.5	2.81	7.39	22 50.7
1657.5	2.78	7.33	22 52.7
1594.2	2.76	7.26	22 54.8
1532.1	2.74	7.20	22 56.9
+1471.2	2.72	7.14	22 59.0
1411.4	2.69	7.08	23 1.2
1352.2	2.67	7.03	23 3.4
1293.4	2.65	6.98	23 5.7
1235.2	2.63	6.93	23 8.0
+1177.1	2.61	6.88	23 10.3
1118.7	2.60	6.84	23 12.7
1059.9	2.58	6.80	23 15.1
1000.5	2.56	6.76	23 17.5
940.1	2.55	6.72	23 20.0
+ 878.4	2.54	6.69	23 22.5
815.0	2.52	6.66	23 25.1
749.7	2.51	6.63	23 27.7
682.0	2.50	6.60	23 30.3
611.6	2.49	6.58	23 33.0
+ 537.9	2.49	6.56	23 35.7
460.6	2.49	6.55	23 38.5
379.0	2.48	6.53	23 41.3
293.0	2.47	6.51	23 44.2
201.7	2.47	6.50	23 47.2
+ 104.5	2.47	6.50	23 50.2
+ 1.0	2.47	6.50	23 53.2
− 109.5	2.47	6.50	23 56.3
227.6	2.47	6.50	23 59.5
353.7	2.47	6.51	. . . . . .
− 488.7	2.48	6.53	0 2.7
632.9	2.40	6.55	0 6.0
786.6	2.49	6.58	0 9.3
950.1	2.50	6.61	0 12.7
1123.5	2.52	6.65	0 16.1
−1306.6	2.54	6.69	0 19.6
−1490.0	2.56	6.74	0 23.1

GREENWICH MEAN TIME.

Date.		Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi-diameter.	Hor. Parallax.
		Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.
		h m s	s	° ′ ″	″			″	″
Apr.	1	0 53 9.44	+18.454	+ 4 54 49.1	+141.59	0.121 8842	−1123.5	2.52	6.65
	2	1 0 33.46	18.545	5 51 32.5	141.96	0.118 9700	1306.6	2.54	6.69
	3	1 7 59.43	18.615	6 48 19.6	141.90	0.115 6050	1499.0	2.56	6.74
	4	1 15 26.78	18.659	7 44 59.8	141.37	0.111 7679	1700.0	2.58	6.80
	5	1 22 54.82	18.672	8 41 21.5	140.35	0.107 4392	1908.4	2.61	6.87
	6	1 30 22.76	+18.650	+ 9 37 12.4	+138.80	0.102 6027	−2122.9	2.64	6.95
	7	1 37 49.68	18.586	10 32 19.7	136.71	0.097 2457	2341.9	2.67	7.03
	8	1 45 14.55	18.479	11 26 30.2	134.07	0.091 3598	2563.3	2.71	7.13
	9	1 52 36.28	18.324	12 19 30.5	130.87	0.084 9417	2785.0	2.75	7.24
	10	1 59 53.67	18.117	13 11 7.6	127.14	0.077 9935	3004.6	2.79	7.35
	11	2 7 5.48	+17.858	+14 1 8.9	+122.89	0.070 5228	−3220.1	2.84	7.48
	12	2 14 10.45	17.547	14 49 22.7	118.18	0.062 5424	3429.0	2.89	7.62
	13	2 21 7.30	17.182	15 35 38.2	113.05	0.054 0706	3629.3	2.95	7.77
	14	2 27 54.78	16.766	16 19 46.0	107.54	0.045 1301	3819.1	3.01	7.93
	15	2 34 31.66	16.299	17 1 37.7	101.72	0.035 7480	3997.2	3.07	8.10
	16	2 40 56.76	+15.785	+17 41 6.6	+ 95.65	0.025 9540	−4162.1	3.15	8.29
	17	2 47 8.97	15.225	18 18 7.3	89.38	0.015 7815	4312.7	3.23	8.49
	18	2 53 7.24	14.624	18 52 35.5	82.95	0.005 2649	4448.6	3.30	8.69
	19	2 58 50.60	13.983	19 24 28.3	76.43	9.994 4403	4569.3	3.38	8.91
	20	3 4 18.11	13.304	19 53 43.8	69.85	9.983 3448	4674.3	3.47	9.14
	21	3 9 28.92	+12.592	+20 20 21.0	+ 63.24	9.972 0163	−4763.5	3.57	9.39
	22	3 14 22.26	11.848	20 44 19.5	56.63	9.960 4928	4836.8	3.66	9.64
	23	3 18 57.38	11.074	21 5 39.5	50.04	9.948 8128	4893.8	3.76	9.90
	24	3 23 13.60	10.274	21 24 21.7	43.48	9.937 0159	4934.3	3.86	10.17
	25	3 27 10.31	9.448	21 40 27.0	36.97	9.925 1414	4958.2	3.97	10.46
	26	3 30 46.94	+ 8.601	+21 53 56.6	+ 30.51	9.913 2301	−4965.0	4.08	10.75
	27	3 34 2.98	7.733	22 4 51.9	24.11	9.901 3236	4954.1	4.19	11.04
	28	3 36 57.99	6.849	22 13 14.3	17.76	9.889 4651	4925.0	4.31	11.35
	29	3 39 31.61	5.951	22 19 5.1	11.49	9.877 6990	4876.8	4.42	11.66
	30	3 41 43.55	5.043	22 22 26.1	+ 5.27	9.866 0723	4808.8	4.54	11.98
May	1	3 43 33.64	+ 4.131	+22 23 18.7	− 0.89	9.854 6334	−4720.0	4.67	12.30
	2	3 45 1.82	3.218	22 21 44.8	6.93	9.843 4337	4609.5	4.79	12.62
	3	3 46 8.14	2.311	22 17 46.7	12.90	9.832 5260	4476.4	4.91	12.94
	4	3 46 52.83	1.416	22 11 26.7	18.75	9.821 9659	4319.7	5.03	13.26
	5	3 47 16.28	+ 0.542	22 2 48.1	24.45	9.811 8108	4138.9	5.15	13.57
	6	3 47 19.10	− 0.302	+21 51 54.5	− 29.98	9.802 1191	−3933.3	5.27	13.88
	7	3 47 2.08	1.110	21 38 50.8	35.29	9.792 9509	3702.8	5.38	14.17
	8	3 46 26.22	1.870	21 23 42.9	40.32	9.784 3653	3447.6	5.49	14.46
	9	3 45 32.77	2.574	21 6 37.9	45.03	9.776 4216	3168.2	5.59	14.72
	10	3 44 23.19	3.212	20 47 44.6	49.35	9.769 1760	2866.1	5.68	14.97
	11	3 42 59.19	− 3.775	+20 27 12.9	− 53.20	9.762 6814	−2542.7	5.77	15.20
	12	3 41 22.64	4.256	20 5 15.0	56.53	9.756 9863	2200.2	5.84	15.40
	13	3 39 35.62	4.647	19 42 4.0	59.27	9.752 1333	1841.7	5.90	15.57
	14	3 37 40.33	4.944	19 17 55.1	61.36	9.748 1561	1470.6	5.96	15.72
	15	3 35 39.08	5.143	18 53 4.5	62.74	9.745 0818	1090.3	6.00	15.83
	16	*3 33 34.26*	*− 5.242*	*+18 27 49.3*	*− 63.39*	*9.742 9268*	*− 705.0*	*6.03*	*15.91*
	17	*3 31 28.25*	*− 5.242*	*+18 2 27.7*	*− 63.28*	*9.741 6986*	*− 318.8*	*6.05*	*15.93*

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi-diameter.	Hor. Parallax.	Transit, Meridian of Greenwich.
	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″			″	″	h m
y 17	3 31 28.25	− 5.242	+18 2 27.7	−63.28	9.741 6986	− 318.8	6.05	15.95	23 47.0
18	3 29 23.38	5.148	17 37 17.8	62.41	9.741 3937	+ 63.9	6.05	15.96	23 41.1
19	3 27 21.90	4.960	17 12 37.9	60.80	9.741 9996	439.4	6.04	15.94	23 35.3
20	3 25 25.98	4.687	16 48 45.3	58.46	9.743 4938	803.8	6.02	15.88	23 29.5
21	3 23 37.56	4.355	16 25 56.9	55.47	9.745 8462	1153.8	5.99	15.80	23 23.9
22	3 21 58.45	− 3.913	+16 4 27.7	−51.87	9.749 0184	+1486.7	5.95	15.68	23 18.5
23	3 20 30.23	3.429	15 44 31.5	47.73	9.752 9668	1800.2	5.90	15.54	23 13.4
24	3 19 14.28	2.892	15 26 20.1	43.15	9.757 6426	2092.7	5.83	15.38	23 8.4
25	3 18 11.76	2.311	15 10 3.4	38.19	9.762 9943	2363.2	5.76	15.19	23 3.6
26	3 17 23.64	1.694	14 55 49.5	32.93	9.768 9679	2611.0	5.68	14.98	22 59.1
27	3 16 50.67	− 1.049	+14 43 44.3	−27.47	9.775 5087	+2836.0	5.60	14.76	22 54.9
28	3 16 33.44	− 0.384	14 33 52.0	21.87	9.782 5625	3038.3	5.50	14.52	22 51.0
29	3 16 32.35	+ 0.296	14 26 15.0	16.21	9.790 0763	3219.4	5.41	14.27	22 47.3
30	3 16 47.70	0.984	14 20 54.2	10.53	9.797 9992	3379.6	5.31	14.01	22 43.9
31	3 17 19.63	1.677	14 17 49.1	− 4.91	9.806 2825	3519.9	5.22	13.75	22 40.7
ne 1	3 18 8.21	+ 2.371	+14 16 57.9	+ 0.62	9.814 8801	+3641.9	5.11	13.48	22 37.8
2	3 19 13.40	3.062	14 18 17.9	6.02	9.823 7498	3746.7	5.01	13.20	22 35.3
3	3 20 35.14	3.749	14 21 45.4	11.24	9.832 8515	3835.5	4.90	12.93	22 32.9
4	3 22 13.28	4.429	14 27 16.1	16.28	9.842 1487	3909.9	4.80	12.66	22 30.9
5	3 24 7.65	5.101	14 34 45.1	21.10	9.851 6080	3970.7	4.70	12.38	22 29.1
6	3 26 18.09	+ 5.767	+14 44 6.9	+25.68	9.861 1983	+4019.4	4.59	12.11	22 27.6
7	3 28 44.42	6.425	14 55 15.9	30.02	9.870 8920	4056.9	4.50	11.85	22 26.3
8	3 31 26.44	7.075	15 8 6.0	34.11	9.880 6629	4084.0	4.39	11.58	22 25.3
9	3 34 23.97	7.718	15 22 30.9	37.98	9.890 4875	4101.7	4.30	11.32	22 24.6
10	3 37 36.86	8.356	15 38 24.2	41.47	9.900 3444	4111.0	4.20	11.07	22 24.1
11	3 41 4.98	+ 8.987	+15 55 39.3	+44.74	9.910 2139	+4112.1	4.10	10.82	22 23.9
12	3 44 48.18	9.613	16 14 9.5	47.73	9.920 0765	4105.7	4.01	10.58	22 23.9
13	3 48 46.40	10.238	16 33 47.9	50.42	9.929 9156	4092.3	3.93	10.34	22 24.1
14	3 52 59.57	10.859	16 54 27.5	52.83	9.939 7143	4072.2	3.85	10.11	22 24.6
15	3 57 27.64	11.481	17 16 1.4	54.94	9.949 4571	4045.6	3.76	9.89	22 25.4
16	4 2 10.64	+12.102	+17 38 22.2	+56.74	9.959 1281	+4012.5	3.67	9.67	22 26.4
17	4 7 8.56	12.725	18 1 22.4	58.22	9.968 7121	3973.1	3.59	9.46	22 27.7
18	4 12 21.46	13.350	18 24 54.4	59.39	9.978 1936	3927.1	3.51	9.25	22 29.2
19	4 17 49.40	13.979	18 48 50.2	60.21	9.987 5568	3874.4	3.44	9.06	22 30.9
20	4 23 32.46	14.611	19 13 1.7	60.69	9.996 7852	3814.7	3.37	8.87	22 32.9
21	4 29 30.73	+15.245	+19 37 20.1	+60.79	0.005 8618	+3747.9	3.29	8.68	22 35.2
22	4 35 44.26	15.883	20 1 36.5	60.51	0.014 7688	3673.3	3.23	8.51	22 37.7
23	4 42 13.14	16.524	20 25 41.5	59.83	0.023 4870	3590.5	3.17	8.34	22 40.5
24	4 48 57.39	17.164	20 49 25.1	58.73	0.031 9963	3499.1	3.10	8.17	22 43.6
25	4 55 57.00	17.803	21 12 37.0	57.19	0.040 2752	3398.4	3.04	8.02	22 46.9
26	5 3 11.88	+18.436	+21 35 6.4	+55.18	0.048 3009	+3288.1	2.98	7.87	22 50.4
27	5 10 41.87	19.061	21 56 41.8	52.69	0.056 0501	3167.8	2.93	7.73	22 54.2
28	5 18 26.71	19.672	22 17 11.8	49.72	0.063 4981	3037.1	2.88	7.60	22 58.3
29	5 26 25.99	20.264	22 36 24.3	46.24	0.070 6195	2895.7	2.84	7.48	23 2.5
30	5 34 39.19	20.831	22 54 7.1	42.25	0.077 3889	2743.7	2.79	7.36	23 7.1
1	5 43 5.60	+21.364	+23 10 8.2	+37.76	0.083 7811	+2581.4	2.76	7.26	23 11.8
2	5 51 44.35	+21.857	+23 24 15.9	+32.80	0.089 7719	+2409.3	2.72	7.16	23 16.[illegible]

GREENWICH MEAN TIME.

Date.		Apparent Right Ascension. Noon.	Var. per Hour. Noon.	Apparent Declination. Noon.	Var. per Hour. Noon.	Logarithm of Distance from Earth. Noon.	Var. per Hour. Noon.	Semi-diameter. Noon.	Hor. Parallax. Noon.	[illegible]
		h m s	s	° ′ ″	″			″	″	h
July	1	5 43 5.60	+21.304	+23 10 8.2	+ 37.76	0.083 7811	+2581.4	2.76	7.26	23 [illegible]
	2	5 51 44.35	21.857	23 24 15.9	32.80	0.089 7719	2409.3	2.72	7.16	23 [illegible]
	3	6 0 34.37	22.303	23 36 18.8	27.37	0.095 3386	2228.1	2.68	7.07	23 [illegible]
	4	6 9 34.45	22.694	23 46 6.4	21.53	0.100 4606	2039.0	2.65	6.99	23 [illegible]
	5	6 18 43.18	23.023	23 53 29.3	15.32	0.105 1207	1843.4	2.62	6.91	23 [illegible]
	6	6 27 59.02	+23.285	+23 58 19.6	+ 8.82	0.109 3053	+1643.1	2.60	6.84	23 [illegible]
	7	6 37 20.31	23.477	24 0 30.7	+ 2.07	0.113 0050	1459.6	2.57	6.78	23 [illegible]
	8	6 46 45.33	23.596	23 59 58.0	− 4.81	0.116 2146	1235.2	2.55	6.73	23 [illegible]
	9	6 56 12.31	23.641	23 56 39.1	11.77	0.118 9349	1032.0	2.53	6.69	23 [illegible]
	10	7 5 39.51	23.614	23 50 33.0	18.72	0.121 1702	831.4	2.52	6.66	23 [illegible]
	11	7 15 5.24	+23.510	+23 41 41.1	− 25.58	0.122 9292	+ 635.6	2.51	6.63	. . . .
	12	7 24 27.89	23.359	23 30 6.3	32.29	0.124 2259	446.1	2.50	6.61	0 [illegible]
	13	7 33 46.03	23.143	23 15 53.1	38.77	0.125 0761	263.8	2.50	6.60	0 [illegible]
	14	7 42 58.33	22.875	22 59 7.4	44.99	0.125 4989	+ 90.1	2.49	6.59	0 [illegible]
	15	7 52 3.66	22.563	22 39 56.2	50.89	0.125 5156	− 74.7	2.50	6.60	0 [illegible]
	16	8 1 1.04	+22.213	+22 18 27.2	− 56.46	0.125 1479	− 230.0	2.50	6.60	0 [illegible]
	17	8 9 49.68	21.835	21 54 48.9	61.67	0.124 4192	375.7	2.50	6.61	0 [illegible]
	18	8 18 28.93	21.433	21 29 9.8	66.52	0.123 3518	512.1	2.51	6.62	0 [illegible]
	19	8 26 58.32	21.014	21 1 38.8	71.00	0.121 9682	639.4	2.52	6.64	0 [illegible]
	20	8 35 17.49	20.582	20 32 24.9	75.11	0.120 2897	757.9	2.53	6.67	0 [illegible]
	21	8 43 26.22	+20.144	+20 1 36.5	− 78.86	0.118 3368	− 868.2	2.54	6.70	0 [illegible]
	22	8 51 24.37	19.702	19 29 22.2	82.27	0.116 1286	970.8	2.55	6.73	0 52.9
	23	8 59 11.91	19.260	18 55 50.1	85.35	0.113 6826	1066.4	2.56	6.77	0 56.7
	24	9 6 48.87	18.821	18 21 8.0	88.11	0.111 0152	1155.6	2.58	6.81	1 0.4
	25	9 14 15.33	18.385	17 45 23.2	90.57	0.108 1406	1238.8	2.60	6.86	1 3.9
	26	9 21 31.41	+17.957	+17 8 42.8	− 92.75	0.105 0730	−1316.8	2.62	6.91	1 7.2
	27	9 28 37.31	17.536	16 31 13.3	94.67	0.101 8235	1390.3	2.64	6.97	1 10.4
	28	9 35 33.20	17.123	15 53 0.8	96.33	0.098 4028	1459.6	2.66	7.02	1 13.4
	29	9 42 19.28	16.719	15 14 11.4	97.75	0.094 8201	1525.4	2.68	7.07	1 16.2
	30	9 48 55.78	16.324	14 34 50.4	98.96	0.091 0836	1588.0	2.71	7.13	1 18.9
	31	9 55 22.91	+15.939	+13 55 3.1	− 99.95	0.087 2001	−1647.9	2.74	7.20	1 21.4
Aug.	1	10 1 40.90	15.562	13 14 54.2	100.75	0.083 1757	1705.5	2.76	7.27	1 23.7
	2	10 7 49.94	15.194	12 34 28.4	101.37	0.079 0151	1761.4	2.78	7.33	1 25.9
	3	10 13 50.27	14.835	11 53 50.0	101.81	0.074 7223	1815.7	2.81	7.41	1 28.0
	4	10 19 42.06	14.482	11 13 3.0	102.08	0.070 3009	1868.7	2.84	7.48	1 29.9
	5	10 25 25.49	+14.138	+10 32 11.5	−102.19	0.065 7530	−1920.9	2.87	7.56	1 31.7
	6	10 31 0.73	13.800	9 51 19.2	102.15	0.061 0806	1972.6	2.90	7.65	1 33.3
	7	10 36 27.92	13.467	9 10 29.7	101.96	0.056 2845	2024.0	2.93	7.73	1 34.8
	8	10 41 47.18	13.139	8 29 46.4	101.62	0.051 3654	2075.2	2.96	7.82	1 36.2
	9	10 46 58.62	12.815	7 49 12.9	101.15	0.046 3232	2126.6	3.00	7.91	1 37.4
	10	10 52 2.31	+12.493	+ 7 8 52.5	−100.53	0.041 1574	−2178.3	3.04	8.00	1 38.5
	11	10 56 58.30	12.173	6 28 48.6	99.77	0.035 8670	2230.4	3.07	8.10	1 39.5
	12	11 1 46.60	11.853	5 49 4.4	98.88	0.030 4508	2283.1	3.11	8.20	1 40.4
	13	11 6 27.23	11.532	5 9 43.3	97.85	0.024 9073	2336.6	3.15	8.31	1 41.1
	14	11 11 0.12	11.209	4 30 48.6	96.68	0.019 2346	2390.7	3.19	8.42	1 41.7
	15	11 15 25.23	+10.882	+ 3 52 23.9	− 95.30	0.013 4312	−2445.7	3.24	8.53	1 42.2
	16	11 19 42.44	+10.551	+ 3 14 32.6	− 93.80	0.007 4945	−2501.6	3.28	8.65	1 42.5

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension. Noon.	Var. per Hour. Noon.	Apparent Declination. Noon.	Var. per Hour. Noon.	Logarithm of Distance from Earth. Noon.	Var. per Hour. Noon.	Semi-diameter. Noon.	Hor. Parallax. Noon.	Transit. Meridian of Greenwich.
	h m s	s	° ′ ″	″			″	″	h m
. 16	11 19 42.44	+10.551	+3 14 32.6	− 93.89	0.007 4945	−2501.6	3.28	8.65	1 42.5
17	11 23 51.61	10.212	2 37 18.2	92.27	0.001 4228	2558.2	3.32	8.77	1 42.7
18	11 27 52.56	9.866	2 0 44.7	90.49	9.995 2141	2615.8	3.38	8.90	1 42.8
19	11 31 45.08	9.509	1 24 56.0	88.54	9.988 8665	2674.0	3.43	9.03	1 42.7
20	11 35 28.90	9.140	0 49 56.3	86.41	9.982 3785	2732.7	3.47	9.16	1 42.5
21	11 39 3.72	+ 8.758	+0 15 50.0	− 84.09	9.975 7491	−2791.8	3.53	9.31	1 42.1
22	11 42 29.17	8.360	−0 17 18.2	81.57	9.968 9778	2850.9	3.59	9.45	1 41.6
23	11 45 44.85	7.946	0 49 23.4	78.82	9.962 0648	2909.9	3.64	9.60	1 40.9
24	11 48 50.30	7.507	1 20 19.9	75.85	9.955 0110	2968.1	3.70	9.76	1 40.0
25	11 51 45.00	7.047	1 50 2.0	72.62	9.947 8192	3024.9	3.76	9.92	1 39.0
26	11 54 28.38	+ 6.563	−2 18 23.6	− 69.12	9.940 4931	−3079.9	3.83	10.09	1 37.7
27	11 56 59.80	6.050	2 45 17.6	65.33	9.933 0383	3131.8	3.89	10.27	1 36.3
28	11 59 18.56	5.508	3 10 36.8	61.21	9.925 4635	3179.8	3.96	10.45	1 34.7
29	12 1 23.92	4.933	3 34 13.1	56.75	9.917 7793	3222.8	4.03	10.63	1 32.8
30	12 3 15.06	4.323	3 55 57.9	51.92	9.909 9995	3259.1	4.11	10.83	1 30.7
31	12 4 51.13	+ 3.677	−4 15 41.9	− 46.68	9.902 1424	−3287.0	4.18	11.02	1 28.3
pt. 1	12 6 11.24	2.992	4 33 15.2	41.01	9.894 2304	3304.3	4.26	11.23	1 25.7
2	12 7 14.44	2.268	4 48 26.9	34.88	9.886 2921	3308.7	4.34	11.43	1 22.8
3	12 7 59.78	1.504	5 1 5.7	28.26	9.878 3611	3297.6	4.42	11.64	1 19.6
4	12 8 26.33	+ 0.702	5 10 59.6	21.14	9.870 4789	3267.6	4.50	11.86	1 16.1
5	12 8 33.18	− 0.137	−5 17 56.3	− 13.49	9.862 6949	−3215.0	4.58	12.07	1 12.3
6	12 8 19.51	1.007	5 21 42.9	− 5.31	9.855 0681	3136.1	4.67	12.29	1 8.1
7	12 7 44.61	1.905	5 22 7.2	+ 3.38	9.847 6663	3026.5	4.74	12.50	1 3.6
8	12 6 47.95	2.819	5 18 56.8	12.56	9.840 5690	2881.7	4.82	12.70	0 58.7
9	12 5 29.28	3.737	5 12 1.2	22.14	9.833 8662	2696.9	4.90	12.90	0 53.4
10	12 3 48.64	− 4.646	−5 1 11.3	+ 32.06	9.827 6596	−2467.7	4.97	13.09	0 47.8
11	12 1 46.49	5.526	4 46 20.9	42.16	9.822 0598	2190.4	5.03	13.26	0 41.9
12	11 59 23.80	6.354	4 27 27.4	52.28	9.817 1868	1861.7	5.09	13.41	0 35.6
13	11 56 42.11	7.105	4 4 33.3	62.17	9.813 1660	1480.1	5.13	13.53	0 28.9
14	11 53 43.60	7.751	3 37 47.1	71.58	9.810 1247	1045.7	5.17	13.63	0 22.1
15	11 50 31.12	− 8.264	−3 7 23.9	+ 80.20	9.808 1868	− 561.1	5.20	13.69	0 14.9
16	11 47 8.20	8.617	2 33 46.4	87.71	9.807 4673	− 31.6	5.20	13.71	0 7.7
17	11 43 39.01	8.783	1 57 25.3	93.79	9.808 0648	+ 534.9	5.20	13.69	{ 0 0.3 23 52.8
18	11 40 8.25	8.745	1 18 58.1	98.16	9.810 0558	1127.5	5.17	13.63	23 45.5
19	11 36 41.03	8.488	−0 39 9.2	100.56	9.813 4872	1733.0	5.13	13.52	23 38.3
20	11 33 22.69	− 8.005	+0 1 12.2	+100.86	9.818 3729	+2337.0	5.08	13.37	23 31.3
21	11 30 18.52	7.306	0 41 14.6	98.97	9.824 6911	2924.0	5.00	13.18	23 24.6
22	11 27 33.64	6.401	1 20 5.4	94.92	9.832 3827	3479.2	4.92	12.95	23 18.3
23	11 25 12.72	5.314	1 56 54.5	88.85	9.841 3553	3989.5	4.82	12.68	23 12.5
24	11 23 19.82	4.071	2 30 55.3	80.94	9.851 4868	4443.3	4.71	12.39	23 7.2
25	11 21 58.26	− 2.708	+3 1 27.1	+ 71.47	9.862 6313	+4832.5	4.58	12.07	23 2.5
26	11 21 10.53	− 1.259	3 27 56.0	60.75	9.874 6266	5151.7	4.46	11.74	22 58.3
27	11 20 58.24	+ 0.240	3 49 55.6	49.08	9.887 3014	5398.4	4.33	11.41	22 54.8
28	11 21 22.16	1.753	4 7 6.8	36.78	9.900 4812	5573.0	4.20	11.07	22 51.8
29	11 22 22.26	3.250	4 19 18.3	24.14	9.913 9963	5678.2	4.07	10.73	22 49.4
30	11 23 57.80	+ 4.702	+4 26 25.1	+ 11.44	9.927 6845	+5718.2	3.95	10.39	22 47.6
1	*11 26 7.39*	*+ 6.085*	*+4 28 28.6*	− 1.10	9.941 3965	+5699.2	3.82	10.07	22 46.3

GREENWICH MEAN TIME.

Date.		Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi-diameter.
		Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.
		h m s	s	° ′ ″	″			″
Oct.	1	11 26 7.39	+ 6.085	+ 4 28 28.6	− 1.10	9.941 3965	+5699.2	3.82
	2	11 28 49.18	7.382	4 25 35.4	13.26	9.954 9986	5627.8	3.70
	3	11 32 0.93	8.579	4 17 56.6	24.88	9.968 3740	5511.4	3.59
	4	11 35 40.12	9.668	4 5 46.5	35.84	9.981 4232	5357.4	3.48
	5	11 39 44.09	10.644	3 49 22.5	46.02	9.994 0658	5173.6	3.39
	6	11 44 10.12	+11.507	+ 3 29 3.9	− 55.39	0.006 2379	+4966.5	3.29
	7	11 48 55.53	12.259	3 5 10.9	63.88	0.017 8917	4742.9	3.21
	8	11 53 57.72	12.907	2 38 4.8	71.49	0.028 9951	4508.6	3.12
	9	11 59 14.28	13.457	2 8 6.3	78.24	0.039 5283	4268.5	3.05
	10	12 4 42.96	13.919	1 35 36.2	84.14	0.049 4825	4026.7	2.98
	11	12 10 21.75	+14.301	+ 1 0 54.1	− 89.24	0.058 8582	+3787.1	2.91
	12	12 16 8.83	14.610	+ 0 24 18.8	93.58	0.067 6638	3552.0	2.86
	13	12 22 2.63	14.862	− 0 13 52.3	97.23	0.075 9128	3323.4	2.81
	14	12 28 1.81	15.061	0 53 23.2	100.24	0.083 6227	3103.1	2.76
	15	12 34 5.18	15.214	1 33 59.2	102.66	0.090 8150	2892.0	2.72
	16	12 40 11.79	+15.331	− 2 15 26.9	−104.56	0.097 5119	+2690.3	2.67
	17	12 46 20.83	15.417	2 57 34.5	105.99	0.103 7366	2498.8	2.63
	18	12 52 31.63	15.479	3 40 11.2	107.00	0.109 5141	2317.2	2.60
	19	12 58 43.66	15.521	4 23 7.5	107.64	0.114 8671	2145.2	2.56
	20	13 4 56.51	15.547	5 6 15.0	107.94	0.119 8189	1982.8	2.53
	21	13 11 9.84	+15.562	− 5 49 26.1	−107.94	0.124 3916	+1829.3	2.50
	22	13 17 23.42	15.568	6 32 34.3	107.69	0.128 6062	1684.2	2.48
	23	13 23 37.07	15.568	7 15 33.6	107.21	0.132 4820	1547.1	2.46
	24	13 29 50.67	15.565	7 58 18.9	106.53	0.136 0384	1417.6	2.44
	25	13 36 4.15	15.559	8 40 45.7	105.67	0.139 2919	1294.8	2.43
	26	13 42 17.49	+15.552	− 9 22 49.8	−104.65	0.142 2585	+1178.4	2.41
	27	13 48 30.66	15.546	10 4 27.6	103.48	0.144 9528	1067.8	2.39
	28	13 54 43.72	15.542	10 45 36.0	102.19	0.147 3883	962.6	2.38
	29	14 0 56.69	15.540	11 26 12.0	100.79	0.149 5771	862.2	2.37
	30	14 7 9.65	15.541	12 6 13.0	99.28	0.151 5302	766.1	2.35
	31	14 13 22.67	+15.545	−12 45 36.7	− 97.68	0.153 2575	+ 674.0	2.34
Nov.	1	14 19 35.83	15.553	13 24 20.9	95.99	0.154 7682	585.4	2.34
	2	14 25 49.23	15.564	14 2 23.5	94.22	0.156 0700	500.0	2.33
	3	14 32 2.95	15.580	14 39 42.7	92.37	0.157 1702	417.2	2.33
	4	14 38 17.10	15.600	15 16 16.9	90.46	0.158 0748	337.1	2.32
	5	14 44 31.76	+15.623	−15 52 4.3	− 88.48	0.158 7899	+ 259.1	2.32
	6	14 50 47.04	15.651	16 27 3.4	86.44	0.159 3197	182.7	2.32
	7	14 57 3.03	15.682	17 1 12.7	84.33	0.159 6683	108.0	2.32
	8	15 3 19.81	15.717	17 34 30.8	82.17	0.159 8394	+ 34.8	2.32
	9	15 9 37.47	15.755	18 6 56.2	79.94	0.159 8359	− 37.7	2.32
	10	15 15 56.07	+15.796	−18 38 27.6	− 77.67	0.159 6593	− 109.3	2.32
	11	15 22 15.71	15.841	19 9 3.7	75.33	0.159 3118	180.3	2.32
	12	15 28 36.44	15.887	19 38 42.9	72.93	0.158 7942	250.9	2.32
	13	15 34 58.32	15.936	20 7 24.1	70.49	0.158 1074	321.5	2.32
	14	15 41 21.38	15.986	20 35 6.0	67.99	0.157 2508	392.3	2.33
	15	15 47 45.67	+16.038	−21 1 47.0	− 65.42	0.156 2242	− 463.3	2.34
	16	15 54 11.21	+16.090	−21 27 25.8	− 62.80	0.155 0265	− 534.9	2.34

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension. Noon.	Var. per Hour. Noon.	Apparent Declination. Noon.	Var. per Hour. Noon.	Logarithm of Distance from Earth. Noon.	Var. per Hour. Noon.	Semi-diameter. Noon.	Hor. Parallax. Noon.	Transit, Meridian of Greenwich.
	h m s	s	° ′ ″	″			″	″	h m
Nov. 16	15 54 11.21	+16.090	−21 27 25.8	−62.80	0.155 0265	534.9	2.34	6.16	0 14.3
17	16 0 38.01	16.143	21 52 1.2	60.14	0.153 6561	607.3	2.35	6.18	0 16.8
18	16 7 6.08	16.195	22 15 31.9	57.41	0.152 1107	680.7	2.35	6.20	0 19.3
19	16 13 35.38	16.246	22 37 56.2	54.61	0.150 3880	755.1	2.36	6.22	0 21.9
20	16 20 5.90	16.296	22 59 12.9	51.77	0.148 4848	831.2	2.37	6.25	0 24.4
21	16 26 37.59	+16.344	−23 19 20.7	−48.86	0.146 3970	− 908.8	2.38	6.28	0 27.0
22	16 33 10.37	16.388	23 38 17.9	45.89	0.144 1209	988.3	2.39	6.31	0 29.6
23	16 39 44.17	16.428	23 56 3.2	42.87	0.141 6515	1069.9	2.41	6.35	0 32.3
24	16 46 18.87	16.463	24 12 35.3	39.79	0.138 9834	1154.0	2.43	6.39	0 34.9
25	16 52 54.35	16.492	24 27 52.8	36.65	0.136 1100	1240.8	2.44	6.43	0 37.6
26	16 59 30.45	+16.515	−24 41 54.0	−33.44	0.133 0253	−1330.4	2.46	6.48	0 40.2
27	17 6 6.99	16.529	24 54 37.7	30.19	0.129 7214	1423.4	2.48	6.53	0 42.9
28	17 12 43.74	16.532	25 6 2.6	26.87	0.126 1902	1520.0	2.49	6.58	0 45.6
29	17 19 20.45	16.525	25 16 7.1	23.50	0.122 4225	1620.4	2.52	6.64	0 48.2
30	17 25 56.84	16.505	25 24 50.3	20.08	0.118 4087	1725.1	2.54	6.70	0 50.9
Dec. 1	17 32 32.57	+16.470	−25 32 10.6	−16.60	0.114 1381	−1834.5	2.57	6.77	0 53.6
2	17 39 7.24	16.417	25 38 7.0	13.09	0.109 5991	1948.9	2.60	6.84	0 56.2
3	17 45 40.43	16.345	25 42 38.5	9.53	0.104 7794	2068.5	2.62	6.91	0 58.8
4	17 52 11.61	16.250	25 45 44.1	5.94	0.099 6659	2193.9	2.66	6.99	1 1.4
5	17 58 40.24	16.130	25 47 23.2	− 2.32	0.094 2438	2325.4	2.69	7.08	1 3.9
6	18 5 5.63	+15.981	−25 47 35.1	+ 1.32	0.088 4990	−2463.2	2.73	7.18	1 6.4
7	18 11 27.07	15.799	25 46 19.6	4.97	0.082 4150	2607.9	2.77	7.28	1 8.8
8	18 17 43.70	15.580	25 43 36.6	8.61	0.075 9754	2759.6	2.81	7.39	1 11.2
9	18 23 54.57	15.319	25 39 26.5	12.23	0.069 1633	2918.5	2.85	7.50	1 13.4
10	18 29 58.60	15.009	25 33 50.0	15.81	0.061 9610	3084.6	2.89	7.63	1 15.5
11	18 35 54.55	+14.645	−25 26 48.3	+19.32	0.054 3512	−3258.1	2.94	7.76	1 17.5
12	18 41 41.05	14.219	25 18 23.2	22.75	0.046 3164	3438.6	3.00	7.91	1 19.3
13	18 47 16.52	13.724	25 8 37.2	26.07	0.037 8408	3625.5	3.06	8.06	1 21.0
14	18 52 39.19	13.161	24 57 33.2	29.24	0.028 9096	3817.9	3.12	8.23	1 22.4
15	18 57 47.05	12.489	24 45 15.3	32.21	0.019 5114	4014.6	3.19	8.41	1 23.6
16	19 2 37.88	+11.729	−24 31 48.7	+34.96	0.009 6378	−4213.6	3.26	8.61	1 24.4
17	19 7 9.17	10.859	24 17 19.2	37.44	9.999 2866	4412.0	3.34	8.81	1 25.0
18	19 11 18.16	9.869	24 1 54.1	39.60	9.988 4635	4606.1	3.43	9.04	1 25.2
19	19 15 1.82	8.747	23 45 41.5	41.38	9.977 1843	4791.2	3.52	9.27	1 24.9
20	19 18 16.86	7.482	23 28 51.2	42.74	9.965 4778	4961.0	3.62	9.53	1 24.2
21	19 20 59.78	+ 6.069	−23 11 33.8	+43.62	9.953 3897	−5107.9	3.72	9.80	1 22.9
22	19 23 6.94	4.502	22 54 1.3	44.00	9.940 9859	5222.4	3.82	10.08	1 21.1
23	19 24 34.68	2.784	22 36 26.1	43.84	9.928 3572	5293.3	3.94	10.38	1 18.6
24	19 25 19.44	+ 0.924	22 19 1.4	43.12	9.915 6228	5308.2	4.06	10.69	1 15.4
25	19 25 18.07	− 1.057	22 2 0.6	41.86	9.902 9333	5253.6	4.17	11.00	1 11.4
26	19 24 28.02	− 3.125	−21 45 36.2	+40.07	9.890 4724	−5115.5	4.30	11.32	1 6.6
27	19 22 47.77	5.231	21 30 0.1	37.86	9.878 4563	4880.9	4.42	11.64	1 0.9
28	19 20 17.14	7.310	21 15 22.0	35.25	9.867 1291	4540.2	4.54	11.95	0 54.5
29	19 16 57.72	9.283	21 1 50.3	32.35	9.856 7527	4088.1	4.65	12.24	0 47.2
30	19 12 53.11	11.063	20 49 31.0	29.24	9.847 5942	3526.1	4.74	12.50	0 39.2
31	19 8 9.10	−12.551	−20 38 28.0	+25.99	9.839 9078	−2863.9	4.83	12.72	0 30.6
32	19 2 53.57	....	−20 28 44.2	...	9.833 9126	....	4.90	12.90	0 21.4

FOR GREENWICH MEAN NOON.

Date.		Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Log Radi
		° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″	
an.	1	12 18 53.7	5 10 27.6	−12 6.9	−4 2 0.9	+31 4.4	9.5
	2	17 33 55.3	5 19 35.2	11 7.2	3 29 29.8	33 56.8	9.5
	3	22 58 1.9	5 28 36.3	9 42.2	2 54 10.3	36 40.4	9.5
	4	28 31 3.1	5 37 23.0	7 53.3	2 16 13.8	39 9.8	9.5
	5	34 12 40.0	5 45 46.0	5 43.0	1 35 57.1	41 19.8	9.5
	6	40 2 23.9	5 53 35.4	− 3 15.5	−0 53 42.6	+43 4.4	9.5
	7	45 59 36.3	6 0 41.0	− 0 36.6	−0 9 58.8	44 17.6	9.4
	8	52 3 27.8	6 6 51.9	+ 2 6.9	+0 34 40.5	44 54.5	9.4
	9	58 12 58.4	6 11 57.7	4 47.0	1 19 36.7	44 51.0	9.4
	10	64 26 58.4	6 15 49.2	7 15.5	2 4 7.9	44 4.1	9.4
	11	70 44 9.3	6 18 18.4	+ 9 24.2	+2 47 30.1	+42 33.1	9.4
	12	77 3 5.9	6 19 19.9	11 6.1	3 28 59.8	40 19.4	9.4
	13	83 22 18.8	6 18 50.7	12 15.6	4 7 55.9	37 26.6	9.4
	14	89 40 17.0	6 16 50.6	12 49.2	4 43 41.6	33 59.6	9.4
	15	95 55 30.8	6 13 22.8	12 45.9	5 15 46.1	30 5.4	9.4
	16	102 6 35.2	6 8 33.0	+12 7.0	+5 43 45.9	+25 51.6	9.4
	17	108 12 12.0	6 2 29.1	10 55.7	6 7 25.5	21 26.3	9.4
	18	114 11 12.1	5 55 21.4	9 17.1	6 26 37.3	16 57.2	9.5
	19	120 2 37.2	5 47 21.0	7 17.3	6 41 21.0	12 31.2	9.5
	20	125 45 40.2	5 38 39.2	5 2.8	6 51 42.7	8 14.2	9.5
	21	131 19 45.7	5 29 27.8	+ 2 40.5	+6 57 53.9	+ 4 10.8	9.5
	22	136 44 29.5	5 19 57.5	+ 0 16.3	7 0 10.1	+ 0 24.6	9.5
	23	141 59 37.7	5 10 18.0	− 2 4.2	6 58 49.5	− 3 2.5	9.5
	24	147 5 5.4	5 0 38.0	4 16.6	6 54 11.9	6 9.4	9.5
	25	152 0 55.8	4 51 4.4	6 17.1	6 46 37.7	8 55.6	9.5
	26	156 47 18.5	4 41 43.4	− 8 3.4	+6 36 27.3	−11 22.0	9.5
	27	161 24 28.4	4 32 39.5	9 33.6	6 24 0.2	13 29.2	9.5
	28	165 52 44.4	4 23 56.1	10 46.8	6 9 35.0	15 18.4	9.5
	29	170 12 28.2	4 15 35.4	11 42.9	5 53 28.8	16 51.3	9.5
	30	174 24 3.6	4 7 39.6	12 22.0	5 35 57.3	18 9.4	9.5
	31	178 27 55.9	4 0 9.2	−12 44.8	+5 17 14.4	−19 14.2	9.5
'eb.	1	182 24 30.7	3 53 4.8	12 52.3	4 57 33.0	20 6.9	9.5
	2	186 14 14.0	3 46 26.2	12 45.6	4 37 4.1	20 49.3	9.6
	3	189 57 31.5	3 40 13.0	12 26.0	4 15 57.5	21 22.4	9.6
	4	193 34 48.3	3 34 24.8	11 54.7	3 54 21.9	21 47.6	9.6
	5	197 6 29.2	3 29 0.8	−11 13.3	+3 32 24.7	−22 5.8	9.6
	6	200 32 57.8	3 24 0.2	10 23.0	3 10 12.3	22 18.0	9.6
	7	203 54 37.0	3 19 21.8	9 25.1	2 47 50.4	22 25.0	9.6
	8	207 11 48.6	3 15 5.0	8 21.0	2 25 23.9	22 27.4	9.6
	9	210 24 53.8	3 11 8.7	7 11.7	2 2 56.9	22 26.0	9.6
	10	213 34 12.5	3 7 31.9	− 5 58.5	+1 40 33.0	−22 21.2	9.6
	11	216 40 3.8	3 4 13.8	4 42.3	1 18 15.4	22 13.6	9.6
	12	219 42 46.1	3 1 13.7	3 24.2	0 56 6.6	22 3.6	9.6
	13	222 42 36.9	2 58 30.6	2 5.0	0 34 9.0	21 51.2	9.6
	14	225 39 52.8	2 56 3.9	− 0 45.5	+0 12 24.7	21 37.1	9.6
	15	228 34 49.9	2 53 52.8	+ 0 33.3	−0 9 4.6	−21 21.2	9.6
	16	231 27 43.4	2 51 56.8	+ 1 50.9	−0 30 17.3	−21 4.0	9.6

FOR MEAN NOON.

FOR [illegible] MEAN NOON

Logarithm of Radius Vector.	Var. per Day.
9.663 0328	+17725
9.664 6736	15094
9.666 0518	12472
9.667 1681	9856
9.668 0231	7246
9.668 6176	+ 4642
9.668 9517	+ 2040
9.669 0257	− 559
9.668 8399	3159
[illegible]	5762
9.667 6874	− 8367
9.666 7202	10979
9.665 4914	13598
9.664 0006	16223
9.662 2465	18860
9.660 2283	−21505
9.657 9452	24160
9.655 3960	26826
9.652 5797	29500
9.649 4957	32181
9.646 1433	−34870
9.642 5218	37568
9.638 6318	40243
9.634 4735	42918
9.630 0487	45576
9.625 3591	−48208
9.620 4084	50799
9.615 2011	53336
9.609 7437	55799
9.604 0445	58168
9.598 1143	−60414
9.591 9668	62508
9.585 6191	64412
9.579 0920	66086
9.572 4111	67482
9.565 6068	−68542
9.558 7157	69210
9.551 7800	69420
9.544 8493	69100
9.537 9802	68176
9.531 2366	−66576
9.524 6896	64235
9.518 4165	61087
9.512 5006	57065
9.507 0281	52213
9.502 0873	−46481
9.497 7941	−39886

FOR GREENWICH MEAN NOON.

Date.		Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Logarithm of Radius Vector.
		° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″	
July	1	40 24 29.4	5 54 2.6	− 3 6.1	−0 51 3.6	+43 9.8	9.502 0873
	2	46 22 7.4	6 1 5.0	− 0 26.6	−0 7 15.4	44 21.0	9.497 7641
	3	52 26 21.1	6 7 12.2	+ 2 16.9	+0 37 26.0	44 55.4	9.494 1399
	4	58 36 10.0	6 12 13.8	4 56.6	1 22 21.9	44 40.3	9.491 2872
	5	64 50 23.7	6 16 0.4	7 24.0	2 6 50.1	43 59.8	9.489 2658
	6	71 7 43.2	6 18 24.4	+ 9 31.3	+2 50 6.6	+42 26.0	9.488 1201
	7	77 26 43.2	6 19 20.5	11 11.3	3 31 28.0	40 9.9	9.487 8751
	8	83 45 53.9	6 18 45.6	12 18.7	4 10 13.4	37 14.8	9.488 5365
	9	90 3 44.3	6 16 40.2	12 50.1	4 45 46.3	33 46.0	9.490 0899
	10	96 18 45.1	6 13 7.2	12 44.6	5 17 36.4	29 50.4	9.492 5004
	11	102 29 31.4	6 8 12.4	+12 3.5	+5 45 20.6	+25 35.6	9.495 7165
	12	108 34 45.6	6 2 4.5	10 50.4	6 8 43.9	21 9.8	9.499 6719
	13	114 33 19.3	5 54 53.3	9 10.3	6 27 39.2	16 40.8	9.504 2897
	14	120 24 14.8	5 46 50.0	7 9.4	6 42 6.6	12 15.2	9.509 4861
	15	126 6 45.7	5 38 6.2	4 54.3	6 52 12.6	7 58.8	9.515 1736
	16	131 40 17.5	5 28 53.4	+ 2 31.6	+6 58 8.9	+ 3 56.4	9.521 2645
	17	137 4 26.4	5 19 22.2	+ 0 7.5	7 0 11.2	+ 0 11.3	9.527 6737
	18	142 18 59.1	5 9 42.5	− 2 12.6	6 58 38.0	− 3 14.6	9.534 3208
	19	147 23 51.4	5 0 2.6	4 24.3	6 53 48.9	6 20.2	9.541 1300
	20	152 19 6.7	4 50 29.8	6 24.1	6 46 4.6	9 5.2	9.548 0348
	21	157 4 55.2	4 41 9.8	− 8 9.4	+6 35 45.2	−11 30.2	9.554 9745
	22	161 41 32.0	4 32 7.0	9 38.6	6 23 10.4	13 36.3	9.561 8954
	23	166 9 16.1	4 23 24.8	10 50.8	6 8 38.5	15 24.6	9.568 7515
	24	170 28 29.4	4 15 5.8	11 45.8	5 52 26.6	16 56.6	9.575 5032
	25	174 39 35.9	4 7 11.4	12 23.9	5 34 50.3	18 13.8	9.582 1167
	26	178 43 0.8	3 59 42.6	−12 45.7	+5 16 3.5	−19 17.7	9.588 5641
	27	182 39 9.8	3 52 39.7	12 52.3	4 56 18.8	20 9.8	9.594 8221
	28	186 28 28.8	3 46 2.6	12 44.8	4 35 47.3	20 51.6	9.600 8716
	29	190 11 23.6	3 39 51.2	12 24.4	4 14 38.7	21 24.2	9.606 6970
	30	193 48 19.4	3 34 4.4	11 52.5	3 53 1.5	21 49.0	9.612 2863
	31	197 19 40.5	3 28 41.8	−11 10.4	+3 31 3.1	−22 6.8	9.617 6296
Aug.	1	200 45 50.9	3 23 42.6	10 19.6	3 8 50.0	22 18.6	9.622 7196
	2	204 7 13.1	3 19 5.6	9 21.4	2 46 27.7	22 25.2	9.627 5506
	3	207 24 9.2	3 14 50.0	8 16.8	2 24 1.0	22 27.4	9.632 1188
	4	210 37 0.0	3 10 54.9	7 7.3	2 1 34.1	22 25.8	9.636 4213
	5	213 46 5.5	3 7 19.4	− 5 53.9	+1 39 10.5	−22 21.0	9.640 4561
	6	216 51 44.9	3 4 2.4	4 37.5	1 16 53.2	22 13.1	9.644 2226
	7	219 54 16.3	3 1 3.2	3 19.3	0 54 45.1	22 2.8	9.647 7203
	8	222 53 57.1	2 58 21.2	2 0.1	0 32 48.3	21 50.4	9.650 9492
	9	225 51 4.1	2 55 55.4	− 0 40.6	+0 11 4.8	21 36.2	9.653 9101
	10	228 45 53.1	2 53 45.3	+ 0 38.1	−0 10 23.5	−21 20.2	9.656 6035
	11	231 38 39.7	2 51 50.2	1 55.7	0 31 35.2	21 2.8	9.659 0303
	12	234 29 38.4	2 50 9.6	3 11.2	0 52 28.8	20 44.2	9.661 1913
	13	237 19 3.5	2 48 43.0	4 24.1	1 13 3.1	20 24.2	9.663 0879
	14	240 7 9.0	2 47 30.1	5 34.0	1 33 16.8	20 3.2	9.664 7209
	15	242 54 8.1	2 46 30.3	+ 6 40.2	−1 53 9.0	−19 41.0	9.666 0912
	16	245 40 13.9	2 45 43.4	+ 7 42.2	−2 12 38.5	−19 17.9	9.667 1996

FOR MEAN NOON.

garithm of ius Vector.	Var. per Day.
667 1996	+ 0777
668 0468	7168
668 6333	4564
668 9596	+ 1962
[illegible]	− 638
668 8321	− 3237
668 3783	5839
667 6641	8446
666 6889	11059
665 4521	13677
663 9532	−16304
662 1911	18940
660 1649	21586
657 8735	24242
655 3161	26908
652 4915	−29583
649 3993	32264
646 0385	34950
642 4091	37640
638 5107	40325
634 3444	−43001
629 9111	45660
625 2134	48290
620 2545	50890
615 0393	53415
609 5740	−55876
603 8674	58240
[illegible]	60494
591 7759	62572
585 4220	64471
578 8895	−66138
572 2039	67520
565 3964	68573
[illegible]	69231
551 6657	69423
544 6356	−69084
537 7689	68149
531 0297	66522
524 4894	64155
518 2256	60982
512 3214	−56958
506 8634	52056
501 9395	46276
497 6363	39654
494 0344	32262
491 2061	−24206
489 2108	−13608

FOR MEAN NOON.

Date.		Heliocentric Longitude, Mean Equinox of Date.		
		°	′	″
Oct.	1	65	2	7.5
	2	71	19	32.0
	3	77	38	34.3
	4	83	57	44.5
	5	90	15	31.7
	6	96	30	26.5
	7	102	41	4.4
	8	108	46	7.9
	9	114	44	28.9
	10	120	35	10.0
	11	126	17	25.3
	12	131	50	40.4
	13	137	14	32.0
	14	142	28	47.2
	15	147	33	21.8
	16	152	28	19.8
	17	157	13	51.2
	18	161	50	11.4
	19	166	17	39.4
	20	170	36	37.4
	21	174	47	29.4
	22	178	50	40.4
	23	182	46	36.4
	24	186	35	43.1
	25	190	18	26.4
	26	193	55	11.4
	27	197	26	22.6
	28	200	52	23.6
	29	204	13	37.3
	30	207	30	25.4
	31	210	43	8.9
Nov.	1	213	52	7.7
	2	216	57	40.9
	3	220	0	6.6
	4	222	59	42.4
	5	225	56	44.8
	6	228	51	29.8
	7	231	44	12.6
	8	234	35	8.2
	9	237	24	30.6
	10	240	12	33.7
	11	242	59	30.9
	12	245	45	35.2
	13	248	30	59.5
	14	251	15	56.2
	15	254	0	37.7
	16	256	45	16.4

FOR MEAN NOON.

GREENWICH MEAN TIME.

GREENWICH MEAN TIME.

GREENWICH MEAN TIME.

Date.		Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi-diameter.	Hor. Parallax.
		Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.
		h m s	s	° ′ ″	″			″	″
Apr.	1	0 19 42.77	+11.353	+ 0 35 16.1	+74.91	0.233 1819	+144.7	5.00	5.14
	2	0 24 15.22	11.352	1 5 13.8	74.89	0.233 5234	139.9	5.00	5.14
	3	0 28 47.66	11.352	1 35 10.8	74.85	0.233 8532	135.0	5.00	5.14
	4	0 33 20.15	11.355	2 5 6.5	74.78	0.234 1712	130.1	4.99	5.13
	5	0 37 52.73	11.360	2 35 0.2	74.68	0.234 4775	125.1	4.99	5.13
	6	0 42 25.44	+11.366	+ 3 4 51.1	+74.55	0.234 7719	+120.2	4.98	5.12
	7	0 46 58.31	11.374	3 34 38.5	74.39	0.235 0545	115.3	4.98	5.12
	8	0 51 31.40	11.384	4 4 21.8	74.21	0.235 3253	110.4	4.98	5.12
	9	0 56 4.75	11.395	4 34 0.3	73.99	0.235 5842	105.4	4.98	5.12
	10	1 0 38.39	11.409	5 3 33.2	73.74	0.235 8311	100.4	4.97	5.11
	11	1 5 12.38	+11.424	+ 5 32 59.7	+73.46	0.236 0659	+ 95.3	4.97	5.11
	12	1 9 46.76	11.441	6 2 19.3	73.16	0.236 2885	90.2	4.97	5.11
	13	1 14 21.56	11.459	6 31 31.2	72.82	0.236 4989	85.1	4.96	5.10
	14	1 18 56.82	11.479	7 0 34.6	72.45	0.236 6968	79.8	4.96	5.10
	15	1 23 32.59	11.501	7 29 28.8	72.06	0.236 8821	74.6	4.96	5.10
	16	1 28 8.90	+11.525	+ 7 58 13.1	+71.63	0.237 0547	+ 69.2	4.96	5.10
	17	1 32 45.79	11.550	8 26 46.8	71.17	0.237 2144	63.9	4.96	5.10
	18	1 37 23.30	11.576	8 55 9.1	70.68	0.237 3612	58.5	4.95	5.09
	19	1 42 1.45	11.604	9 23 19.3	70.16	0.237 4950	53.0	4.95	5.09
	20	1 46 40.29	11.633	9 51 16.6	69.61	0.237 6156	47.5	4.95	5.09
	21	1 51 19.84	+11.663	+10 19 0.3	+69.03	0.237 7229	+ 41.9	4.95	5.09
	22	1 56 0.14	11.695	10 46 29.6	68.41	0.237 8169	36.4	4.95	5.09
	23	2 0 41.22	11.728	11 13 43.8	67.77	0.237 8975	30.8	4.95	5.09
	24	2 5 23.10	11.762	11 40 42.1	67.09	0.237 9647	25.2	4.95	5.09
	25	2 10 5.82	11.797	12 7 23.8	66.38	0.238 0184	19.6	4.95	5.09
	26	2 14 49.39	+11.834	+12 33 48.1	+65.64	0.238 0586	+ 14.0	4.95	5.09
	27	2 19 33.86	11.872	12 59 54.3	64.87	0.238 0854	8.4	4.95	5.09
	28	2 24 19.24	11.910	13 25 41.7	64.07	0.238 0988	+ 2.8	4.95	5.09
	29	2 29 5.56	11.950	13 51 9.5	63.24	0.238 0987	− 2.9	4.95	5.09
	30	2 33 52.85	11.991	14 16 17.0	62.38	0.238 0851	8.5	4.95	5.09
May	1	2 38 41.12	+12.032	+14 41 3.4	+61.48	0.238 0580	− 14.1	4.95	5.09
	2	2 43 30.40	12.075	15 5 28.0	60.56	0.238 0175	19.7	4.95	5.09
	3	2 48 20.72	12.118	15 29 30.1	59.61	0.237 9634	25.4	4.95	5.09
	4	2 53 12.08	12.162	15 53 8.9	58.62	0.237 8958	31.0	4.95	5.09
	5	2 58 4.50	12.207	16 16 23.7	57.61	0.237 8146	36.6	4.95	5.09
	6	3 2 58.01	+12.252	+16 39 13.8	+56.56	0.237 7199	− 42.3	4.95	5.09
	7	3 7 52.60	12.298	17 1 38.5	55.49	0.237 6115	48.0	4.95	5.09
	8	3 12 48.31	12.344	17 23 37.0	54.38	0.237 4894	53.7	4.95	5.09
	9	3 17 45.13	12.391	17 45 8.6	53.25	0.237 3536	59.4	4.95	5.09
	10	3 22 43.08	12.438	18 6 12.6	52.08	0.237 2040	65.2	4.96	5.10
	11	3 27 42.17	+12.486	+18 26 48.3	+50.89	0.237 0404	− 71.1	4.96	5.10
	12	3 32 42.39	12.533	18 46 54.9	49.66	0.236 8628	76.9	4.96	5.10
	13	3 37 43.74	12.580	19 6 31.8	48.41	0.236 6710	82.9	4.96	5.10
	14	3 42 46.23	12.627	19 25 38.2	47.12	0.236 4649	88.9	4.96	5.10
	15	3 47 49.85	12.674	19 44 13.5	45.81	0.236 2444	94.9	4.97	5.11
	16	3 52 54.59	+12.721	+20 2 17.0	+44.47	0.236 0092	−101.1	4.97	5.11
	17	3 58 0.44	+12.767	+20 19 48.0	+43.10	0.235 7593	−107.2	4.97	5.11

GREENWICH MEAN TIME.

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GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi-diameter.	Hor. Parallax.
	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.
	h m s	s	° ′ ″	″			″	″
ily 1	7 56 23.34	+12.989	+22 10 3.0	−32.51	0.208 4622	−404.5	5.29	5.44
2	8 1 34.55	12.945	21 56 43.9	34.08	0.207 4831	411.4	5.31	5.46
3	8 6 44.69	12.900	21 42 47.3	35.63	0.206 4876	418.2	5.32	5.47
4	8 11 53.73	12.853	21 28 13.7	37.16	0.205 4756	425.1	5.33	5.48
5	8 17 1.64	12.806	21 13 3.7	38.67	0.204 4473	431.9	5.35	5.50
6	8 22 8.40	+12.757	+20 57 17.7	−40.16	0.203 4027	−438.7	5.36	5.51
7	8 27 13.99	12.708	20 40 56.4	41.61	0.202 3416	445.5	5.37	5.52
8	8 32 18.38	12.658	20 24 0.4	43.05	0.201 2641	452.4	5.38	5.54
9	8 37 21.56	12.607	20 6 30.2	44.46	0.200 1701	459.3	5.39	5.55
10	8 42 23.53	12.556	19 48 26.6	45.84	0.199 0595	466.2	5.40	5.56
11	8 47 24.26	+12.504	+19 29 50.0	−47.20	0.197 9323	−473.2	5.42	5.58
12	8 52 23.74	12.453	19 10 41.3	48.53	0.196 7883	480.2	5.43	5.59
13	8 57 21.98	12.401	18 51 1.0	49.83	0.195 6275	487.2	5.45	5.61
14	9 2 18.96	12.348	18 30 49.8	51.10	0.194 4497	494.3	5.46	5.62
15	9 7 14.67	12.295	18 10 8.4	52.34	0.193 2548	501.4	5.48	5.64
16	9 12 9.13	+12.243	+17 48 57.5	−53.56	0.192 0428	−508.6	5.49	5.65
17	9 17 2.32	12.190	17 27 17.8	54.74	0.190 8135	515.8	5.51	5.67
18	9 21 54.25	12.137	17 5 10.0	55.90	0.189 5669	523.0	5.53	5.69
19	9 26 44.92	12.085	16 42 34.8	57.03	0.188 3029	530.3	5.54	5.70
20	9 31 34.33	12.033	16 19 33.0	58.12	0.187 0215	537.5	5.56	5.72
21	9 36 22.50	+11.981	+15 56 5.3	−59.19	0.185 7227	−544.8	5.58	5.74
22	9 41 9.44	11.930	15 32 12.3	60.22	0.184 4064	552.1	5.59	5.75
23	9 45 55.15	11.879	15 7 54.9	61.22	0.183 0726	559.4	5.61	5.77
24	9 50 39.66	11.830	14 43 13.8	62.20	0.181 7213	566.7	5.63	5.79
25	9 55 22.97	11.780	14 18 9.7	63.14	0.180 3525	574.0	5.65	5.81
26	10 0 5.09	+11.731	+13 52 43.4	−64.05	0.178 9662	−581.3	5.67	5.83
27	10 4 46.06	11.683	13 26 55.6	64.93	0.177 5624	588.5	5.69	5.85
28	10 9 25.89	11.636	13 0 47.0	65.78	0.176 1412	595.8	5.71	5.87
29	10 14 4.60	11.590	12 34 18.4	66.60	0.174 7025	603.1	5.72	5.88
30	10 18 42.22	11.545	12 7 30.4	67.39	0.173 2464	610.3	5.73	5.90
31	10 23 18.77	+11.501	+11 40 23.9	−68.15	0.171 7730	−617.5	5.75	5.92
ug. 1	10 27 54.28	11.458	11 12 59.5	68.88	0.170 2825	624.6	5.78	5.95
2	10 32 28.78	11.417	10 45 17.9	69.58	0.168 7748	631.8	5.80	5.97
3	10 37 2.30	11.377	10 17 19.9	70.25	0.167 2500	638.9	5.82	5.99
4	10 41 34.87	11.338	9 49 6.2	70.89	0.165 7081	646.0	5.84	6.01
5	10 46 6.54	+11.301	+ 9 20 37.4	−71.51	0.164 1491	−653.1	5.86	6.03
6	10 50 37.33	11.265	8 51 54.2	72.09	0.162 5730	660.3	5.88	6.05
7	10 55 7.29	11.231	8 22 57.3	72.64	0.160 9798	667.5	5.90	6.07
8	10 59 36.44	11.198	7 53 47.5	73.17	0.159 3692	674.7	5.93	6.10
9	11 4 4.83	11.167	7 24 25.4	73.67	0.157 7413	682.0	5.95	6.12
10	11 8 32.49	+11.138	+ 6 54 51.7	−74.14	0.156 0958	−689.3	5.97	6.14
11	11 12 59.46	11.110	6 25 7.1	74.57	0.154 4326	696.7	6.00	6.17
12	11 17 25.78	11.083	5 55 12.4	74.98	0.152 7517	704.1	6.02	6.19
13	11 21 51.48	11.059	5 25 8.2	75.36	0.151 0530	711.5	6.04	6.21
14	11 26 16.61	11.036	4 54 55.2	75.72	0.149 3363	719.0	6.07	6.24
15	11 30 41.20	+11.014	+ 4 24 34.1	−76.03	0.147 6015	−726.6	6.08	6.26
16	11 35 5.28	+10.993	+ 3 54 5.8	−76.32	0.145 8484	−734.2	6.11	6.29

GREENWICH MEAN TIME.

	Apparent Right Ascension. Noon.	Var. per Hour. Noon.	Apparent Declination. Noon.	Var. per Hour. Noon.	Logarithm of Distance from Earth. Noon.	Var. per Hour. Noon.	Semi-diameter. Noon.	Hor. Parallax. Noon.	Transit, Meridian of Greenwich.
	h m s	s	° ′ ″	″			″	″	h m
16	11 35 5.28	+10.993	+ 3 54 5.8	−76.32	0.145 8484	− 734.2	6.11	6.29	1 57.9
17	11 39 28.90	10.975	3 23 30.8	76.59	0.144 0771	741.9	6.14	6.32	1 58.4
18	11 43 52.09	10.958	2 52 49.9	76.82	0.142 2874	749.6	6.16	6.34	1 58.8
19	11 48 14.90	10.943	2 22 3.8	77.02	0.140 4791	757.3	6.19	6.37	1 59.2
20	11 52 37.36	10.929	1 51 13.2	77.19	0.138 6522	765.1	6.21	6.39	1 59.7
21	11 56 59.51	+10.917	+ 1 20 18.8	−77.34	0.136 8066	− 772.9	6.24	6.42	2 0.1
22	12 1 21.38	10.906	0 49 21.3	77.45	0.134 9422	780.8	6.27	6.45	2 0.5
23	12 5 43.02	10.897	+ 0 18 21.3	77.54	0.133 0589	788.6	6.30	6.48	2 0.9
24	12 10 4.47	10.890	− 0 12 40.4	77.59	0.131 1568	796.5	6.33	6.51	2 1.3
25	12 14 25.76	10.884	0 43 43.0	77.62	0.129 2357	804.4	6.35	6.53	2 1.8
26	12 18 46.93	+10.880	− 1 14 46.0	−77.62	0.127 2957	− 812.2	6.38	6.56	2 2.2
27	12 23 8.03	10.878	1 45 48.6	77.59	0.125 3369	820.1	6.41	6.59	2 2.6
28	12 27 29.08	10.877	2 16 50.1	77.53	0.123 3591	828.0	6.43	6.62	2 3.0
29	12 31 50.13	10.878	2 47 49.8	77.44	0.121 3625	835.9	6.46	6.65	2 3.4
30	12 36 11.22	10.880	3 18 47.1	77.33	0.119 3469	843.7	6.49	6.68	2 3.8
31	12 40 32.39	+10.884	− 3 49 41.3	−77.18	0.117 3125	− 851.6	6.53	6.72	2 4.2
1	12 44 53.68	10.890	4 20 31.7	77.01	0.115 2591	859.5	6.56	6.75	2 4.6
2	12 49 15.14	10.898	4 51 17.6	76.81	0.113 1869	867.4	6.59	6.78	2 5.0
3	12 53 36.81	10.908	5 21 58.4	76.58	0.111 0957	875.3	6.62	6.81	2 5.5
4	12 57 58.72	10.919	5 52 33.4	76.33	0.108 9856	883.2	6.66	6.85	2 5.9
5	13 2 20.93	+10.932	− 6 23 2.0	−76.05	0.106 8562	− 891.2	6.69	6.88	2 6.3
6	13 6 43.46	10.946	6 53 23.5	75.74	0.104 7077	899.2	6.72	6.91	2 6.7
7	13 11 6.37	10.963	7 23 37.2	75.40	0.102 5398	907.4	6.76	6.95	2 7.2
8	13 15 29.70	10.981	7 53 42.3	75.03	0.100 3522	915.6	6.78	6.98	2 7.6
9	13 19 53.47	11.000	8 23 38.2	74.63	0.098 1448	923.9	6.82	7.02	2 8.1
10	13 24 17.73	+11.022	− 8 53 24.2	−74.20	0.095 9174	− 932.3	6.85	7.05	2 8.6
11	13 28 42.52	11.044	9 22 59.6	73.74	0.093 6697	940.8	6.89	7.09	2 9.0
12	13 33 7.87	11.068	9 52 23.7	73.26	0.091 4016	949.4	6.93	7.13	2 9.5
13	13 37 33.81	11.093	10 21 35.7	72.74	0.089 1129	958.0	6.97	7.17	2 10.0
14	13 42 0.37	11.120	10 50 34.9	72.19	0.086 8032	966.7	7.00	7.20	2 10.5
15	13 46 27.60	+11.149	−11 19 20.7	−71.62	0.084 4725	− 975.6	7.04	7.24	2 11.0
16	13 50 55.52	11.178	11 47 52.4	71.01	0.082 1204	984.5	7.08	7.28	2 11.5
17	13 55 24.15	11.208	12 16 9.1	70.37	0.079 7468	993.5	7.12	7.32	2 12.1
18	13 59 53.52	11.240	12 44 10.1	69.71	0.077 3514	1002.7	7.15	7.36	2 12.6
19	14 4 23.66	11.272	13 11 54.8	69.01	0.074 9339	1011.9	7.19	7.40	2 13.2
20	14 8 54.59	+11.306	−13 39 22.3	−68.28	0.072 4943	−1021.2	7.24	7.45	2 13.7
21	14 13 26.34	11.340	14 6 31.9	67.52	0.070 0322	1030.6	7.28	7.49	2 14.3
22	14 17 58.92	11.375	14 33 23.0	66.73	0.067 5476	1040.0	7.32	7.53	2 14.9
23	14 22 32.36	11.411	14 59 54.8	65.91	0.065 0403	1049.4	7.37	7.58	2 15.6
24	14 27 6.67	11.448	15 26 6.6	65.06	0.062 5102	1059.0	7.41	7.62	2 16.2
25	14 31 41.87	+11.485	−15 51 57.6	−64.18	0.059 9570	−1068.7	7.45	7.67	2 16.8
26	14 36 17.97	11.523	16 17 27.1	63.27	0.057 3806	1078.4	7.49	7.71	2 17.5
27	14 40 54.99	11.562	16 42 34.4	62.33	0.054 7809	1088.1	7.54	7.76	2 18.2
28	14 45 32.95	11.601	17 7 18.8	61.36	0.052 1579	1097.8	7.58	7.80	2 18.9
29	14 50 11.84	11.640	17 31 39.5	60.36	0.049 5116	1107.5	7.63	7.85	2 19.6
30	14 54 51.69	+11.680	−17 55 35.9	−59.33	0.046 8417	−1117.3	7.68	7.90	2 20.3
31	*14 59 32.50*	*+11.721*	*−18 19 7.3*	−58.28	0.044 1483	−1127.2	7.73	7.95	2 21.0

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi-diameter.	Hor. Parallax.
	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.
	h m s	s	° ′ ″	″			″	″
Oct. 1	14 59 32.50	+11.721	−18 19 7.3	−58.28	0.044 1483	−1127.2	7.73	7.95
2	15 4 14.29	11.761	18 42 13.0	57.19	0.041 4312	1137.1	7.78	8.00
3	15 8 57.05	11.802	19 4 52.2	56.08	0.038 6900	1147.2	7.82	8.05
4	15 13 40.80	11.844	19 27 4.4	54.93	0.035 9247	1157.3	7.87	8.10
5	15 18 25.54	11.885	19 48 48.8	53.76	0.033 1349	1167.5	7.92	8.15
6	15 23 11.26	+11.926	−20 10 4.8	−52.56	0.030 3204	−1177.9	7.98	8.21
7	15 27 57.97	11.967	20 30 51.5	51.33	0.027 4808	1188.4	8.03	8.26
8	15 32 45.66	12.007	20 51 8.5	50.08	0.024 6158	1199.1	8.08	8.31
9	15 37 34.32	12.048	21 10 55.0	48.80	0.021 7251	1209.9	8.14	8.37
10	15 42 23.94	12.087	21 30 10.5	47.49	0.018 8082	1220.9	8.19	8.43
11	15 47 14.51	+12.126	−21 48 54.1	−46.15	0.015 8648	−1232.0	8.24	8.48
12	15 52 5.99	12.164	22 7 5.3	44.79	0.012 8944	1243.3	8.30	8.54
13	15 56 58.37	12.201	22 24 43.5	43.40	0.009 8966	1254.8	8.36	8.60
14	16 1 51.62	12.237	22 41 48.1	41.98	0.006 8710	1266.5	8.42	8.66
15	16 6 45.72	12.271	22 58 18.3	40.54	0.003 8171	1278.4	8.48	8.72
16	16 11 40.62	+12.304	−23 14 13.8	−39.08	0.000 7347	−1290.3	8.53	8.78
17	16 16 36.31	12.336	23 29 33.9	37.59	9.997 6233	1302.5	8.60	8.85
18	16 21 32.72	12.365	23 44 18.0	36.08	9.994 4824	1314.9	8.66	8.91
19	16 26 29.83	12.393	23 58 25.6	34.55	9.991 3116	1327.5	8.73	8.98
20	16 31 27.57	12.418	24 11 56.2	33.00	9.988 1104	1340.2	8.79	9.04
21	16 36 25.90	+12.442	−24 24 49.4	−31.43	9.984 8785	−1353.1	8.85	9.11
22	16 41 24.76	12.463	24 37 4.7	29.84	9.981 6155	1366.1	8.92	9.18
23	16 46 24.09	12.481	24 48 41.7	28.24	9.978 3210	1379.3	8.99	9.25
24	16 51 23.83	12.497	24 59 39.9	26.61	9.974 9948	1392.6	9.06	9.32
25	16 56 23.93	12.511	25 9 59.0	24.97	9.971 6364	1406.1	9.13	9.39
26	17 1 24.33	+12.522	−25 19 38.6	−23.32	9.968 2456	−1419.6	9.20	9.47
27	17 6 24.95	12.530	25 28 38.5	21.66	9.964 8221	1433.3	9.27	9.54
28	17 11 25.73	12.535	25 36 58.3	19.99	9.961 3658	1447.0	9.35	9.62
29	17 16 26.60	12.537	25 44 37.8	18.30	9.957 8763	1460.9	9.43	9.70
30	17 21 27.49	12.537	25 51 36.7	16.61	9.954 3532	1475.0	9.51	9.78
31	17 26 28.34	+12.533	−25 57 54.9	−14.91	9.950 7963	−1489.2	9.58	9.86
Nov. 1	17 31 29.06	12.527	26 3 32.1	13.20	9.947 2051	1503.5	9.66	9.94
2	17 36 29.60	12.517	26 8 28.3	11.48	9.943 5793	1518.0	9.74	10.02
3	17 41 29.87	12.505	26 12 43.3	9.76	9.939 9183	1532.8	9.83	10.11
4	17 46 29.80	12.489	26 16 17.0	8.04	9.936 2217	1547.7	9.90	10.19
5	17 51 29.31	+12.470	−26 19 9.3	− 6.32	9.932 4890	−1562.9	9.99	10.28
6	17 56 28.33	12.448	26 21 20.4	4.60	9.928 7195	1578.4	10.08	10.37
7	18 1 26.78	12.422	26 22 50.2	2.88	9.924 9127	1594.0	10.17	10.46
8	18 6 24.58	12.393	26 23 38.7	− 1.16	9.921 0680	1609.9	10.25	10.55
9	18 11 21.63	12.361	26 23 46.1	+ 0.55	9.917 1847	1626.2	10.35	10.65
10	18 16 17.86	+12.325	−26 23 12.5	+ 2.25	9.913 2622	−1642.7	10.45	10.75
11	18 21 13.18	12.285	26 21 58.1	3.95	9.909 2997	1659.5	10.54	10.84
12	18 26 7.50	12.241	26 20 3.0	5.64	9.905 2965	1676.6	10.63	10.94
13	18 31 0.74	12.195	26 17 27.5	7.32	9.901 2520	1693.9	10.74	11.05
14	18 35 52.81	12.144	26 14 11.9	8.98	9.897 1655	1711.5	10.84	11.15
15	18 40 43.61	+12.089	−26 10 16.4	+10.63	9.893 0363	−1729.6	10.94	11.26
16	18 45 33.07	+12.031	−26 5 41.6	+12.27	9.888 8634	−1747.9	11.05	11.37

GREENWICH MEAN TIME.

Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi-diameter.	Hor. Parallax.	Transit, Meridian of Greenwich.
Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	
h m s	s	° ′ ″	″			″	″	h m
18 45 33.07	+12.031	−26 5 41.6	+12.27	9.888 8634	−1747.9	11.05	11.37	3 5.7
18 50 21.07	11.969	26 0 27.6	13.89	9.884 6463	1766.5	11.16	11.48	3 6.6
18 55 7.54	11.903	25 54 35.0	15.49	9.880 3841	1785.4	11.27	11.59	3 7.4
18 59 52.39	11.833	25 48 4.3	17.07	9.876 0762	1804.6	11.38	11.71	3 8.2
19 4 35.51	11.760	25 40 55.9	18.63	9.871 7219	1824.0	11.49	11.82	3 9.0
19 9 16.82	+11.682	−25 33 10.4	+20.16	9.867 3207	−1843.7	11.61	11.94	3 9.7
19 13 56.23	11.601	25 24 48.3	21.67	9.862 8718	1863.7	11.73	12.07	3 10.4
19 18 33.64	11.516	25 15 50.3	23.16	9.858 3748	1883.8	11.85	12.19	3 11.1
19 23 8.97	11.428	25 6 16.9	24.62	9.853 8292	1904.2	11.98	12.32	3 11.7
19 27 42.14	11.336	24 56 8.8	26.05	9.849 2344	1924.8	12.10	12.45	3 12.3
19 32 13.06	+11.240	−24 45 26.6	+27.46	9.844 5900	−1945.6	12.24	12.59	3 12.9
19 36 41.64	11.141	24 34 11.0	28.84	9.839 8955	1966.5	12.36	12.72	3 13.4
19 41 7.82	11.040	24 22 22.7	30.18	9.835 1504	1987.7	12.50	12.86	3 13.9
19 45 31.52	10.935	24 10 2.5	31.50	9.830 3542	2009.1	12.65	13.01	3 14.4
19 49 52.65	10.826	23 57 11.0	32.79	9.825 5064	2030.7	12.78	13.15	3 14.8
19 54 11.15	+10.715	−23 43 49.1	+34.04	9.820 6064	−2052.6	12.93	13.30	3 15.1
19 58 26.94	10.601	23 29 57.5	35.26	9.815 6536	2074.7	13.07	13.45	3 15.4
20 2 39.95	10.483	23 15 37.0	36.44	9.810 6474	2097.1	13.23	13.61	3 15.7
20 6 50.11	10.363	23 0 48.5	37.60	9.805 5871	2119.8	13.38	13.77	3 16.0
20 10 57.34	10.239	22 45 32.7	38.71	9.800 4721	2142.8	13.54	13.93	3 16.1
20 15 1.57	+10.113	−22 29 50.7	+39.79	9.795 3015	−2166.1	13.71	14.10	3 16.2
20 19 2.72	9.983	22 13 43.2	40.83	9.790 0748	2189.6	13.87	14.27	3 16.3
20 23 0.72	9.850	21 57 11.1	41.84	9.784 7912	2213.4	14.04	14.44	3 16.3
20 26 55.50	9.714	21 40 15.4	42.80	9.779 4500	2237.6	14.21	14.62	3 16.3
20 30 46.96	9.574	21 22 57.0	43.73	9.774 0504	2262.1	14.40	14.81	3 16.2
20 34 35.03	+ 9.431	−21 5 16.9	+44.61	9.768 5918	−2286.8	14.57	14.99	3 16.0
20 38 19.63	9.285	20 47 16.1	45.45	9.763 0735	2311.8	14.75	15.18	3 15.8
20 42 0.68	9.135	20 28 55.6	46.25	9.757 4948	2337.2	14.95	15.38	3 15.6
20 45 38.08	8.981	20 10 16.5	47.00	9.751 8549	2362.8	15.14	15.58	3 15.3
20 49 11.73	8.823	19 51 19.8	47.71	9.746 1534	2388.6	15.35	15.79	3 14.9
20 52 41.55	+ 8.661	−19 32 6.6	+48.37	9.740 3896	−2414.6	15.55	16.00	3 14.4
20 56 7.42	8.495	19 12 38.2	48.99	9.734 5632	2440.8	15.77	16.22	3 13.9
20 59 29.25	8.324	18 52 55.6	49.55	9.728 6738	2467.0	15.98	16.44	3 13.3
21 2 46.91	8.148	18 33 0.0	50.07	9.722 7214	2493.3	16.19	16.66	3 12.6
21 6 0.30	7.967	18 12 52.7	50.53	9.716 7059	2519.6	16.43	16.90	3 11.9
21 9 9.29	+ 7.781	−17 52 34.8	+50.95	9.710 6274	−2545.7	16.65	17.13	3 11.1
21 12 13.76	7.591	17 32 7.6	51.31	9.704 4865	2571.7	16.89	17.38	3 10.2
21 15 13.60	7.395	17 11 32.3	51.62	9.698 2835	2597.4	17.14	17.63	3 9.3
21 18 8.67	7.193	16 50 50.2	51.88	9.692 0193	2622.7	17.38	17.88	3 8.2
21 20 58.83	6.986	16 30 2.7	52.08	9.685 6947	2647.7	17.64	18.15	3 7.1
21 23 43.97	+ 6.774	−16 9 10.9	+52.23	9.679 3109	−2672.1	17.90	18.42	3 5.9
21 26 23.93	6.555	15 48 16.2	52.32	9.672 8692	2695.9	18.17	18.69	3 4.6
21 28 58.58	6.331	15 27 20.0	52.36	9.666 3713	2719.0	18.44	18.97	3 3.3
21 31 27.77	6.100	15 6 23.6	52.34	9.659 8186	2741.4	18.72	19.26	3 1.8
21 33 51.35	5.864	14 45 28.3	52.26	9.653 2132	2762.9	19.01	19.56	3 0.2
21 36 9.17	+ 5.620	−14 24 35.7	+52.12	9.646 5573	−2783.5	19.30	19.86	2 58.6
21 38 21.07	*+ 5.370*	*−14 3 47.1*	+51.92	9.639 8535	−2802.8	19.61	20.17	2 56.8

FOR GREENWICH MEAN NOON.

Date.		Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	L Ra
		° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″	
.n.	1	213 3 29.8	1 36 18.1	−3 0.5	+2 18 38.2	−4 10.7	9
	3	216 16 0.5	1 36 12.6	2 57.9	2 10 4.2	4 23.1	9
	5	219 28 20.1	1 36 7.0	2 53.1	2 1 6.2	4 34.7	9
	7	222 40 28.7	1 36 1.6	2 46.1	1 51 45.9	4 45.4	9
	9	225 52 26.6	1 35 56.2	2 37.0	1 42 5.2	4 55.2	9
	11	229 4 13.7	1 35 50.9	−2 26.0	+1 32 5.8	−5 4.0	9
	13	232 15 50.4	1 35 45.8	2 13.2	1 21 49.8	5 11.9	9
	15	235 27 16.9	1 35 40.7	1 58.7	1 11 18.9	5 18.8	9
	17	238 38 33.3	1 35 35.8	1 42.8	1 0 35.3	5 24.7	9
	19	241 49 40.2	1 35 31.1	1 25.6	0 49 40.9	5 29.6	9
	21	245 0 38.0	1 35 26.6	−1 7.4	+0 38 37.7	−5 33.4	9
	23	248 11 26.9	1 35 22.4	0 48.4	0 27 27.9	5 36.2	9
	25	251 22 7.6	1 35 18.3	0 28.8	0 16 13.5	5 38.0	9
	27	254 32 40.4	1 35 14.5	−0 8.8	+0 4 56.5	5 38.8	9
	29	257 43 5.8	1 35 11.0	+0 11.3	−0 6 20.9	5 38.5	9
	31	260 53 24.5	1 35 7.8	+0 31.2	−0 17 36.8	−5 37.2	9
eb.	2	264 3 37.0	1 35 4.8	0 50.7	0 28 49.1	5 34.9	9
	4	267 13 43.7	1 35 2.1	1 9.6	0 39 55.7	5 31.5	9
	6	270 23 45.4	1 34 59.7	1 27.6	0 50 54.6	5 27.2	9
	8	273 33 42.5	1 34 57.5	1 44.6	1 1 43.8	5 21.9	9
	10	276 43 35.7	1 34 55.7	+2 0.2	−1 12 21.5	−5 15.6	9
	12	279 53 25.6	1 34 54.2	2 14.4	1 22 45.7	5 8.4	9
	14	283 3 12.6	1 34 52.9	2 27.0	1 32 54.6	5 0.3	9
	16	286 12 57.4	1 34 52.0	2 37.7	1 42 46.2	4 51.2	9
	18	289 22 40.6	1 34 51.3	2 46.6	1 52 18.9	4 41.3	9
	20	292 32 22.6	1 34 50.8	+2 53.4	−2 1 30.9	−4 30.6	9
	22	295 42 4.1	1 34 50.7	2 58.1	2 10 20.7	4 19.0	9
	24	298 51 45.5	1 34 50.8	3 0.6	2 18 46.5	4 6.7	9
	26	302 1 27.4	1 34 51.1	3 0.9	2 26 47.0	3 53.6	9
	28	305 11 10.1	1 34 51.7	2 59.0	2 34 20.6	3 39.9	9
ar.	2	308 20 54.2	1 34 52.5	+2 55.0	−2 41 26.0	−3 25.5	9
	4	311 30 40.1	1 34 53.4	2 48.8	2 48 2.0	3 10.4	9
	6	314 40 28.1	1 34 54.6	2 40.5	2 54 7.3	2 54.8	9
	8	317 50 18.7	1 34 56.0	2 30.3	2 59 40.8	2 38.7	9
	10	321 0 12.3	1 34 57.5	2 18.3	3 4 41.6	2 22.0	9
	12	324 10 9.0	1 34 59.2	+2 4.6	−3 9 8.6	−2 4.9	9
	14	327 20 9.3	1 35 1.1	1 49.4	3 13 1.1	1 47.5	9
	16	330 30 13.4	1 35 3.1	1 32.8	3 16 18.3	1 29.7	9
	18	333 40 21.6	1 35 5.2	1 15.1	3 18 59.7	1 11.6	9
	20	336 50 34.1	1 35 7.4	0 56.4	3 21 4.6	0 53.3	9
	22	340 0 51.1	1 35 9.6	+0 37.1	−3 22 32.8	−0 34.8	9
	24	343 11 12.7	1 35 12.0	+0 17.3	3 23 23.8	−0 16.2	9
	26	346 21 39.2	1 35 14.5	−0 2.7	3 23 37.5	+0 2.5	9
	28	349 32 10.8	1 35 17.1	0 22.7	3 23 13.8	0 21.2	9
	30	352 42 47.5	1 35 19.7	0 42.4	3 22 12.7	0 39.9	9
pr.	1	355 53 29.5	1 35 22.4	−1 1.6	−3 20 34.3	+0 58.5	9
	3	359 4 17.0	1 35 25.1	−1 20.1	−3 18 18.9	+1 16.9	9

FOR GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
	° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″		
1	355 53 29.5	1 35 22.4	−1 1.6	−3 20 34.3	+0 58.5	9.861 4090	−584
3	359 4 17.0	1 35 25.1	1 20.1	3 18 18.9	1 16.9	9.861 2889	616
5	2 15 9.9	1 35 27.9	1 37.6	3 15 26.9	1 35.1	9.861 1627	646
7	5 26 8.5	1 35 30.7	1 53.8	3 11 58.6	1 53.1	9.861 0307	674
9	8 37 12.7	1 35 33.5	2 8.7	3 7 54.6	2 10.8	9.860 8934	699
11	11 48 22.7	1 35 36.5	−2 22.1	−3 3 15.8	+2 28.0	9.860 7513	−722
13	14 59 38.6	1 35 39.4	2 33.7	2 58 2.9	2 44.9	9.860 6046	744
15	18 11 0.5	1 35 42.5	2 43.3	2 52 16.7	3 1.2	9.860 4540	763
17	21 22 28.5	1 35 45.5	2 51.0	2 45 58.3	3 17.1	9.860 2997	779
19	24 34 2.5	1 35 48.6	2 56.5	2 39 8.7	3 32.4	9.860 1424	794
21	27 45 42.8	1 35 51.7	−2 59.9	−2 31 49.2	+3 47.0	9.859 9824	−806
23	30 57 29.4	1 35 54.9	3 1.0	2 24 1.0	4 1.0	9.859 8203	815
25	34 9 22.4	1 35 58.1	2 59.9	2 15 45.7	4 14.2	9.859 6566	822
27	37 21 21.8	1 36 1.3	2 56.5	2 7 4.6	4 26.7	9.859 4918	826
29	40 33 27.8	1 36 4.7	2 51.0	1 57 59.4	4 38.4	9.859 3265	827
1	43 45 40.5	1 36 8.0	−2 43.3	−1 48 31.6	+4 49.3	9.859 1611	−826
3	46 57 59.9	1 36 11.4	2 33.5	1 38 43.0	4 59.2	9.858 9961	823
5	50 10 26.1	1 36 14.8	2 21.8	1 28 35.5	5 8.2	9.858 8320	817
7	53 22 59.1	1 36 18.3	2 8.3	1 18 10.8	5 16.3	9.858 6694	808
9	56 35 39.2	1 36 21.8	1 53.2	1 7 31.0	5 23.4	9.858 5089	797
11	59 48 26.4	1 36 25.4	−1 36.7	−0 56 37.9	+5 29.5	9.858 3508	−783
13	63 1 20.7	1 36 28.9	1 18.9	0 45 33.7	5 34.6	9.858 1957	767
15	66 14 22.2	1 36 32.5	1 0.1	0 34 20.4	5 38.6	9.858 0441	748
17	69 27 30.8	1 36 36.1	0 40.6	0 23 0.1	5 41.5	9.857 8965	727
19	72 40 46.8	1 36 39.8	0 20.5	0 11 35.0	5 43.4	9.857 7534	704
21	75 54 10.0	1 36 43.4	−0 0.2	−0 0 7.3	+5 44.1	9.857 6152	−678
23	79 7 40.5	1 36 47.0	+0 20.2	+0 11 20.8	5 43.8	9.857 4824	650
25	82 21 18.1	1 36 50.6	0 40.3	0 22 47.3	5 42.4	9.857 3553	620
27	85 35 2.9	1 36 54.2	0 59.9	0 34 9.8	5 39.9	9.857 2344	588
29	88 48 54.8	1 36 57.7	1 18.7	0 45 26.1	5 36.3	9.857 1202	554
31	92 2 53.6	1 37 1.1	+1 36.6	+0 56 34.1	+5 31.5	9.857 0129	−519
2	95 16 59.1	1 37 4.4	1 53.3	1 7 31.5	5 25.7	9.856 9128	481
4	98 31 11.3	1 37 7.7	2 8.5	1 18 16.4	5 18.9	9.856 8205	442
6	101 45 29.8	1 37 10.8	2 22.0	1 28 46.6	5 11.0	9.856 7360	402
8	104 59 54.5	1 37 13.8	2 33.8	1 39 0.0	5 2.1	9.856 6599	360
10	108 14 25.0	1 37 16.7	+2 43.6	+1 48 54.5	+4 52.3	9.856 5922	−317
12	111 29 1.0	1 37 19.3	2 51.3	1 58 28.4	4 41.4	9.856 5332	273
14	114 43 42.1	1 37 21.8	2 56.8	2 7 39.6	4 29.6	9.856 4831	228
16	117 58 28.0	1 37 24.0	3 0.1	2 16 26.4	4 17.0	9.856 4420	183
18	121 13 18.1	1 37 26.0	3 1.0	2 24 47.0	4 3.5	9.856 4101	136
20	124 28 12.0	1 37 27.8	+2 59.6	+2 32 39.8	+3 49.2	9.856 3875	− 90
22	127 43 9.2	1 37 29.3	2 55.9	2 40 3.2	3 34.1	9.856 3743	− 42
24	130 58 9.1	1 37 30.6	2 50.0	2 46 55.9	3 18.4	9.856 3706	+ 5
26	134 13 11.2	1 37 31.5	2 41.9	2 53 16.3	3 2.0	9.856 3762	52
28	137 28 14.7	1 37 32.1	2 31.6	2 59 3.4	2 45.0	9.856 3912	99
30	140 43 19.2	1 37 32.3	+2 19.5	+3 4 15.9	+2 27.4	9.856 4156	+145
2	143 58 23.8	1 37 32.2	+2 5.5	+3 8 52.8	+2 9.4	9.856 4493	+192

FOR GREENWICH MEAN NOON.

Date.		Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	I R
		° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″	
ly	2	143 58 23.8	1 37 32.2	+2 5.5	+3 8 52.8	+2 9.4	9
	4	147 13 28.0	1 37 31.9	1 49.9	3 12 53.3	1 51.0	9
	6	150 28 31.1	1 37 31.1	1 33.0	3 16 16.6	1 32.2	9
	8	153 43 32.3	1 37 30.0	1 14.8	3 19 2.0	1 13.1	9
	10	156 58 31.0	1 37 28.6	0 55.7	3 21 9.0	0 53.8	9
	12	160 13 26.5	1 37 26.8	+0 35.8	+3 22 37.3	+0 34.4	9
	14	163 28 18.0	1 37 24.7	+0 15.6	3 23 26.6	+0 14.9	9
	16	166 43 4.9	1 37 22.2	−0 4.9	3 23 36.8	−0 4.7	9
	18	169 57 46.4	1 37 19.3	0 25.3	3 23 7.9	0 24.2	9
	20	173 12 22.0	1 37 16.2	0 45.4	3 22 0.0	0 43.6	9
	22	176 26 51.0	1 37 12.8	−1 4.9	+3 20 13.4	−1 2.9	9
	24	179 41 12.8	1 37 9.0	1 23.5	3 17 48.6	1 21.9	9
	26	182 55 26.8	1 37 5.0	1 41.1	3 14 46.1	1 40.6	9
	28	186 9 32.5	1 37 0.7	1 57.4	3 11 6.5	1 59.0	9
	30	189 23 29.4	1 36 56.2	2 12.1	3 6 50.6	2 16.9	9
ug.	1	192 37 17.0	1 36 51.4	−2 25.2	+3 1 59.4	−2 34.3	9
	3	195 50 55.0	1 36 46.5	2 36.4	2 56 33.8	2 51.2	9
	5	199 4 22.9	1 36 41.4	2 45.7	2 50 34.9	3 7.6	9
	7	202 17 40.5	1 36 36.2	2 52.8	2 44 3.9	3 23.3	9
	9	205 30 47.6	1 36 30.9	2 57.8	2 37 2.2	3 38.3	9
	11	208 43 43.9	1 36 25.5	−3 0.5	+2 29 31.1	−3 52.7	9
	13	211 56 29.4	1 36 20.0	3 0.9	2 21 32.1	4 6.2	9
	15	215 9 3.8	1 36 14.5	2 59.1	2 13 6.9	4 18.9	9
	17	218 21 27.3	1 36 9.0	2 55.0	2 4 17.1	4 30.8	9
	19	221 33 39.9	1 36 3.5	2 48.8	1 55 4.4	4 41.8	9
	21	224 45 41.5	1 35 58.1	−2 40.4	+1 45 30.7	−4 51.9	9
	23	227 57 32.4	1 35 52.8	2 30.1	1 35 37.6	5 1.0	9
	25	231 9 12.7	1 35 47.6	2 17.9	1 25 27.2	5 9.2	9
	27	234 20 42.8	1 35 42.5	2 4.0	1 15 1.3	5 16.5	9
	29	237 32 2.8	1 35 37.5	1 48.5	1 4 21.9	5 22.7	9
	31	240 43 13.1	1 35 32.8	−1 31.8	+0 53 31.1	−5 27.9	9
pt.	2	243 54 14.1	1 35 28.2	1 13.9	0 42 30.8	5 32.2	9
	4	247 5 6.2	1 35 23.9	0 55.1	0 31 23.1	5 35.4	9
	6	250 15 49.9	1 35 19.8	0 35.7	0 20 10.0	5 37.6	9
	8	253 26 25.5	1 35 15.9	−0 15.8	+0 8 53.6	5 38.6	9
	10	256 36 53.7	1 35 12.3	+0 4.3	−0 2 23.9	−5 38.7	9
	12	259 47 15.0	1 35 9.0	0 24.3	0 13 40.6	5 37.8	9
	14	262 57 29.7	1 35 5.9	0 44.0	0 24 54.4	5 35.8	9
	16	266 7 38.7	1 35 3.1	1 3.1	0 36 3.2	5 32.8	9
	18	269 17 42.2	1 35 0.6	1 21.4	0 47 5.1	5 28.9	9
	20	272 27 41.1	1 34 58.4	+1 38.8	−0 57 58.0	−5 23.9	9
	22	275 37 35.8	1 34 56.4	1 54.9	1 8 39.9	5 17.9	9
	24	278 47 27.0	1 34 54.8	2 9.6	1 19 9.1	5 11.0	9
	26	281 57 15.2	1 34 53.5	2 22.8	1 29 23.5	5 3.2	9
	28	285 7 1.1	1 34 52.4	2 34.2	1 39 21.4	4 54.5	9
	30	288 16 45.0	1 34 51.6	+2 43.7	−1 49 1.0	−4 44.9	9
	2	291 26 27.6	1 34 51.1	+2 51.2	−1 58 20.4	−4 34.4	9

FOR GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
	° ′ ″	° ′ ″	′ ″	° ′ ″	′ ″		
2	291 26 27.6	1 34 51.1	+2 51.2	−1 58 20.4	−4 34.4	9.862 1155	+271
4	294 36 9.6	1 34 50.8	2 56.6	2 7 18.2	4 23.2	9.862 1654	228
6	297 45 51.2	1 34 50.8	2 59.9	2 15 52.6	4 11.1	9.862 2066	184
8	300 55 33.1	1 34 51.1	3 1.0	2 24 2.1	3 58.3	9.862 2389	139
10	304 5 15.8	1 34 51.6	2 59.9	2 31 45.2	3 44.8	9.862 2622	94
12	307 14 59.6	1 34 52.3	+2 56.6	−2 39 0.6	−3 30.6	9.862 2766	+ 49
14	310 24 45.2	1 34 53.3	2 51.2	2 45 47.0	3 15.7	9.862 2819	+ 4
16	313 34 32.8	1 34 54.3	2 43.6	2 52 3.2	3 0.3	9.862 2781	− 41
18	316 44 22.7	1 34 55.6	2 34.1	2 57 48.0	2 44.4	9.862 2653	87
20	319 54 15.5	1 34 57.1	2 22.7	3 3 0.3	2 27.9	9.862 2434	132
22	323 4 11.3	1 34 58.8	+2 9.6	−3 7 39.2	−2 11.0	9.862 2126	−176
24	326 14 10.6	1 35 0.6	1 54.8	3 11 43.9	1 53.6	9.862 1730	220
26	329 24 13.6	1 35 2.5	1 38.7	3 15 13.5	1 35.9	9.862 1245	264
28	332 34 20.6	1 35 4.5	1 21.4	3 18 7.5	1 18.0	9.862 0675	306
30	335 44 31.8	1 35 6.7	1 3.0	3 20 25.2	0 59.7	9.862 0020	348
1	338 54 47.4	1 35 8.9	+0 43.9	−3 22 6.3	−0 41.3	9.861 9283	−389
3	342 5 7.6	1 35 11.3	0 24.3	3 23 10.3	0 22.7	9.861 8466	428
5	345 15 32.6	1 35 13.8	+0 4.3	3 23 37.1	−0 4.0	9.861 7571	467
7	348 26 2.7	1 35 16.3	−0 15.7	3 23 26.4	+0 14.7	9.861 6600	504
9	351 36 37.8	1 35 18.9	0 35.6	3 22 38.4	0 33.4	9.861 5557	539
11	354 47 18.2	1 35 21.5	−0 55.0	−3 21 13.0	+0 52.0	9.861 4444	−573
13	357 58 4.0	1 35 24.2	1 13.7	3 19 10.5	1 10.5	9.861 3266	605
15	1 8 55.2	1 35 27.0	1 31.6	3 16 31.2	1 28.8	9.861 2025	635
17	4 19 51.9	1 35 29.8	1 48.3	3 13 15.5	1 46.9	9.861 0726	663
19	7 30 54.3	1 35 32.7	2 3.7	3 9 23.9	2 4.6	9.860 9373	690
21	10 42 2.6	1 35 35.6	−2 17.6	−3 4 57.2	+2 22.0	9.860 7968	−714
23	13 53 16.6	1 35 38.5	2 29.8	2 59 56.1	2 39.0	9.860 6517	736
25	17 4 36.6	1 35 41.5	2 40.2	2 54 21.4	2 55.6	9.860 5025	756
27	20 16 2.6	1 35 44.5	2 48.6	2 48 14.1	3 11.7	9.860 3495	774
29	23 27 34.7	1 35 47.6	2 54.9	2 41 35.2	3 27.1	9.860 1932	789
1	26 39 13.0	1 35 50.7	−2 59.0	−2 34 26.0	+3 42.0	9.860 0342	−801
3	29 50 57.6	1 35 53.9	3 0.9	2 26 47.7	3 56.2	9.859 8729	812
5	33 2 48.5	1 35 57.1	3 0.6	2 18 41.7	4 9.7	9.859 7097	820
7	36 14 45.9	1 36 0.3	2 58.0	2 10 9.4	4 22.5	9.859 5453	824
9	39 26 49.8	1 36 3.6	2 53.2	2 1 12.4	4 34.4	9.859 3802	827
11	42 39 0.3	1 36 6.9	−2 46.2	−1 51 52.2	+4 45.6	9.859 2148	−827
13	45 51 17.5	1 36 10.3	2 37.1	1 42 10.7	4 55.8	9.859 0496	824
15	49 3 41.6	1 36 13.7	2 26.1	1 32 9.5	5 5.2	9.858 8852	819
17	52 16 12.4	1 36 17.2	2 13.2	1 21 50.6	5 13.6	9.858 7221	811
19	55 28 50.3	1 36 20.7	1 58.7	1 11 15.9	5 21.0	9.858 5608	801
21	58 41 35.2	1 36 24.2	−1 42.6	−1 0 27.2	+5 27.5	9.858 4019	−788
23	61 54 27.3	1 36 27.8	1 25.3	0 49 26.6	5 32.9	9.858 2458	773
25	65 7 26.4	1 36 31.4	1 6.8	0 38 16.2	5 37.3	9.858 0930	755
27	68 20 32.8	1 36 35.0	0 47.5	0 26 58.1	5 40.6	9.857 9441	734
29	71 33 46.5	1 36 38.7	0 27.6	0 15 34.4	5 42.9	9.857 7995	712
31	74 47 7.4	1 36 42.3	−0 7.3	−0 4 7.4	+5 44.0	9.857 6596	−687
33	78 0 35.5	1 36 45.9	+0 13.1	+0 7 20.9	+5 44.0	9.857 5250	−[illegible]

39398°—1917——11

MEAN TIME.

MEAN TIME.

ate.	Apparent Right Ascension. Noon.
	h m s
b. 16	22 9 41.12
17	22 12 42.49
18	22 15 43.46
19	22 18 44.06
20	22 21 44.24
21	22 24 44.05
22	22 27 43.48
23	22 30 42.53
24	22 33 41.21
25	22 36 39.52
26	22 39 37.46
27	22 42 35.04
28	22 45 32.27
r. 1	22 48 29.15
2	22 51 25.69
3	22 54 21.90
4	22 57 17.78
5	23 0 13.35
6	23 3 8.60
7	23 6 3.55
8	23 8 58 21
9	23 11 52.59
10	23 14 46.69
11	23 17 40.53
12	23 20 34.11
[illegible]	23 23 27.44
14	23 26 20.53
15	23 29 13.39
16	23 32 6.04
17	23 34 58.47
18	23 37 50.69
19	23 40 42.72
20	23 43 34.56
21	23 46 26 21
22	23 49 17.69
23	23 52 8.99
24	23 55 0.13
25	23 57 51.11
[illegible]	0 0 41.94
27	0 3 32.62
28	0 6 23.17
29	0 9 13.59
30	0 12 3.88
31	0 14 54.06
r. 1	0 17 44.14
[illegible]	0 20 34.12
[illegible]	0 23 24.01

GREENWICH MEAN TIME.

MEAN TIME.

ate.	Apparent Right Ascension. Noon.	Var. per Hour. Noon.	Semi-diameter. Noon.	Hor. Parallax. Noon.	Transit, Meridian of Greenwich.
	h m s		"	"	h m
y 17	2 28 25.27	− 49.6	2.13	3.71	22 49.0
18	2 31 18.32	51.5	2.13	3.71	22 47.9
19	2 34 11.54	53.5	2.13	3.71	22 46.9
20	2 37 4.94	55.4	2.14	3.72	22 45.8
21	2 39 58.51	57.4	2.14	3.72	22 44.8
22	2 42 52.26	− 59.4	2.14	3.72	22 43.7
23	2 45 46.18	61.5	2.14	3.72	22 42.7
24	2 48 40.26	63.5	2.14	3.72	22 41.6
25	2 51 34.52	65.6	2.14	3.72	22 40.6
26	2 54 28.95	67.7	2.14	3.72	22 39.6
27	2 57 23.55	− 69.7	2.14	3.72	22 38.5
28	3 0 18.31	71.8	2.14	3.73	22 37.5
29	3 3 13.25	73.9	2.14	3.73	22 36.5
30	3 6 8.36	76.0	2.14	3.73	22 35.5
31	3 9 3.62	78.1	2.14	3.73	22 34.4
ne 1	3 11 59.06	− 80.2	2.14	3.73	22 33.4
2	3 14 54.67	82.3	2.14	3.73	22 32.4
3	3 17 50.44	84.5	2.15	3.74	22 31.4
4	3 20 46.38	86.7	2.15	3.74	22 30.4
5	3 23 42.49	89.0	2.15	3.74	22 29.4
6	3 26 38.77	− 91.2	2.15	3.74	22 28.4
7	3 29 35.21	93.5	2.15	3.74	22 27.4
8	3 32 31.82	95.9	2.15	3.75	22 26.4
9	3 35 28.50	98.3	2.15	3.75	22 25.4
10	3 38 25.53	100.8	2.15	3.75	22 24.4
11	3 41 22.62	−103.3	2.15	3.75	22 23.4
12	3 44 19.87	105.9	2.15	3.75	22 22.5
13	3 47 17.27	108.5	2.16	3.76	22 21.5
14	3 50 14.81	111.2	2.16	3.76	22 20.5
15	3 53 12.48	114.0	2.16	3.76	22 19.5
16	3 56 10.28	−116.7	2.16	3.76	22 18.5
17	3 59 8.23	119.5	2.16	3.77	22 17.6
18	4 2 6.28	122.4	2.16	3.77	22 16.6
19	4 5 4.44	125.3	2.16	3.77	22 15.6
20	4 8 2.71	128.2	2.16	3.77	22 14.6
21	4 11 1.06	−131.1	2.17	3.78	22 13.6
22	4 13 59.50	134.0	2.17	3.78	22 12.7
23	4 16 58.03	137.0	2.17	3.78	22 11.7
24	4 19 56.62	140.0	2.17	3.78	22 10.8
25	4 22 55.28	143.0	2.18	3.79	22 9.8
26	4 25 54.00	−146.0	2.18	3.79	22 8.8
27	4 28 52.77	149.0	2.18	3.79	22 7.9
28	4 31 51.59	152.0	2.18	3.80	22 6.9
29	4 34 50.44	155.0	2.18	3.80	22 5.9
30	4 37 49.32	158.1	2.18	3.80	22 5.0
ly 1	4 40 48.25	−161.1	2.19	3.81	22 4.0
2	4 43 47.16	−164.2	2.19	3.81	22 3.1

GREENWICH MEAN TIME.

Date.		Apparent Right Ascension. Noon.	Var. per Hour. Noon.	A De
		h m s	s	°
July	1	4 40 45.23	−7.455	−22
	2	4 43 47 15	7.455	22
	3	4 46 46.08	7.456	22
	4	4 49 45.02	7.456	22
	5	4 52 43.96	7.456	22
	6	4 55 42.90	−7.455	−22
	7	4 58 41.81	7 454	22
	8	5 1 40.71	7.453	22
	9	5 4 39.58	7.452	23
	10	5 7 38.41	7.450	23
	11	5 10 37.20	+7.446	−23
	12	5 13 35.93	7.446	23
	13	5 16 34.60	7.443	23
	14	5 19 33 17	7.439	23
	15	5 22 31.65	7.435	23
	16	5 25 30.04	+7.431	−23
	17	5 28 28 31	7.426	23
	18	5 31 26.46	7.420	23
	19	5 34 24.47	7.413	23
	20	5 37 22.33	7.407	23
	21	5 40 20 03	+7.401	+23
	22	5 43 17 57	7.394	23
	23	5 46 14 92	7.386	23
	24	5 49 12.07	7.377	23
	25	5 52 9.03	7.369	23
	26	5 55 5.78	+7.360	−23
	27	5 58 2 30	7.351	23
	28	6 0 58 60	7.341	23
	29	6 3 54.66	7.331	23
	30	6 6 50 48	7.321	23
	31	6 9 46.05	−7.310	·23
Aug	1	6 12 41 35	7 299	23
	2	6 15 36 30	7.288	23
	3	6 18 31.15	7.276	23
	4	6 21 25.64	7.264	23
	5	6 24 19.83	+7.252	+23
	6	6 27 13.74	7.240	23
	7	6 30 7 34	7.227	23
	8	6 33 0 63	7.214	23
	9	6 35 53 60	7.200	23
	10	6 38 46.23	+7.186	+23
	11	6 41 38 52	7.172	23
	12	6 44 30.46	7.157	23
	13	6 47 22.04	7.141	23
	14	6 50 13 24	7.126	23
	15	6 53 4 07	+7.110	+23
	16	6 55 54.50	+7.[illegible]	+23

GREENWICH MEAN TIME.

	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Semi-diameter.	Hor. Parallax.	Transit. Meridian of Greenwich.
	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″			″	″	h m
16	6 55 54.50	+7.093	+23 27 54.3	− 7.62	0.336 6710	−347.3	2.32	4.05	21 17.7
17	6 58 44.53	7.076	23 24 45.9	8.07	0.335 8315	352.3	2.33	4.06	21 16.6
18	7 1 34.15	7.059	23 21 26.8	8.52	0.334 9798	357.4	2.34	4.07	21 15.4
19	7 4 23.36	7.042	23 17 57.0	8.96	0.334 1159	362.5	2.34	4.08	21 14.3
20	7 7 12.14	7.024	23 14 16.6	9.40	0.333 2396	367.7	2.34	4.08	21 13.2
21	7 10 0.48	+7.005	+23 10 25.9	− 9.83	0.332 3509	−372.9	2.35	4.09	21 12.0
22	7 12 48.38	6.987	23 6 24.9	10.26	0.331 4497	378.1	2.35	4.10	21 10.9
23	7 15 35.84	6.968	23 2 13.6	10.68	0.330 5361	383.3	2.36	4.11	21 9.7
24	7 18 22.83	6.949	22 57 52.3	11.10	0.329 6099	388.5	2.36	4.12	21 8.6
25	7 21 9.37	6.929	22 53 21.0	11.51	0.328 6712	393.8	2.37	4.13	21 7.4
26	7 23 55.44	+6.910	+22 48 39.8	−11.92	0.327 7198	−399.1	2.38	4.14	21 6.2
27	7 26 41.04	6.890	22 43 48.8	12.33	0.326 7557	404.3	2.38	4.15	21 5.0
28	7 29 26.17	6.870	22 38 48.1	12.73	0.325 7789	409.7	2.39	4.16	21 3.8
29	7 32 10.81	6.850	22 33 37.9	13.12	0.324 7892	415.1	2.39	4.17	21 2.6
30	7 34 54.98	6.830	22 28 18.2	13.51	0.323 7866	420.5	2.40	4.18	21 1.4
31	7 37 38.66	+6.810	+22 22 49.2	−13.90	0.322 7709	−426.0	2.40	4.18	21 0.2
1	7 40 21.85	6.789	22 17 11.0	14.28	0.321 7419	431.5	2.41	4.19	20 59.0
2	7 43 4.55	6.769	22 11 23.6	14.66	0.320 6996	437.1	2.41	4.20	20 57.7
3	7 45 46.76	6.749	22 5 27.2	15.03	0.319 6438	442.8	2.42	4.21	20 56.4
4	7 48 28.48	6.728	21 59 22.0	15.40	0.318 5742	448.5	2.43	4.23	20 55.2
5	7 51 9.69	+6.707	+21 53 8.0	−15.76	0.317 4907	−454.4	2.43	4.24	20 54.0
6	7 53 50.40	6.686	21 46 45.4	16.12	0.316 3930	460.3	2.44	4.25	20 52.7
7	7 56 30.60	6.664	21 40 14.3	16.47	0.315 2811	466.3	2.45	4.26	20 51.4
8	7 59 10.29	6.643	21 33 34.8	16.82	0.314 1547	472.4	2.45	4.27	20 50.1
9	8 1 49.45	6.621	21 26 47.0	17.16	0.313 0137	478.5	2.46	4.28	20 48.8
10	8 4 28.08	+6.599	+21 19 51.2	−17.49	0.311 8579	−484.7	2.46	4.29	20 47.5
11	8 7 6.18	6.576	21 12 47.4	17.82	0.310 6871	491.0	2.47	4.30	20 46.2
12	8 9 43.74	6.554	21 5 35.8	18.14	0.309 5013	497.2	2.47	4.31	20 44.9
13	8 12 20.76	6.531	20 58 16.5	18.46	0.308 3004	503.6	2.49	4.33	20 43.6
14	8 14 57.23	6.508	20 50 49.7	18.77	0.307 0842	510.0	2.49	4.34	20 42.2
15	8 17 33.14	+6.485	+20 43 15.5	−19.08	0.305 8526	−516.4	2.50	4.35	20 40.9
16	8 20 8.50	6.461	20 35 34.0	19.38	0.304 6056	522.8	2.50	4.36	20 39.5
17	8 22 43.30	6.438	20 27 45.4	19.67	0.303 3430	529.3	2.51	4.38	20 38.1
18	8 25 17.53	6.415	20 19 49.8	19.96	0.302 0648	535.9	2.52	4.39	20 36.8
19	8 27 51.21	6.391	20 11 47.4	20.24	0.300 7708	542.5	2.53	4.40	20 35.4
20	8 30 24.29	+6.367	+20 3 38.3	−20.52	0.299 4610	−549.0	2.54	4.42	20 34.0
21	8 32 56.80	6.343	19 55 22.6	20.79	0.298 1354	555.6	2.54	4.43	20 32.6
22	8 35 28.74	6.319	19 47 0.6	21.05	0.296 7940	562.2	2.55	4.44	20 31.2
23	8 38 0.10	6.294	19 38 32.3	21.31	0.295 4367	568.9	2.56	4.46	20 29.7
24	8 40 30.87	6.270	19 29 57.8	21.57	0.294 0634	575.6	2.57	4.47	20 28.3
25	8 43 1.07	+6.246	+19 21 17.2	−21.81	0.292 6740	−582.3	2.58	4.49	20 26.9
26	8 45 30.68	6.222	19 12 30.8	22.05	0.291 2685	589.0	2.58	4.50	20 25.4
27	8 47 59.72	6.198	19 3 38.6	22.29	0.289 8467	595.8	2.59	4.51	20 23.9
28	8 50 28.18	6.174	18 54 40.8	22.53	0.288 4085	602.7	2.60	4.53	20 22.5
29	8 52 56.07	6.150	18 45 37.4	22.76	0.286 9537	609.6	2.61	4.54	20 21.0
30	8 55 23.37	+6.126	+18 36 28.6	−22.98	0.285 4823	−616.6	2.62	4.56	20 19.5
1	8 57 50.10	+6.102	+18 27 14.6	−23.19	0.283 9940	−623.6	2.63	4.58	20 18.0

MEAN TIME.

GREENWICH MEAN TIME.

ite.	Apparent Right Ascension. Noon.	Var. per Hour. Noon.	Apparent Declination. Noon.	Var. per Hour. Noon.	Logarithm of Distance from Earth. Noon.	Var. per Hour. Noon.	Semi-diameter. Noon.	Hor. Parallax. Noon.	Transit. Meridian of Greenwich.
	h m s	s	° ′ ″	″			″	″	h m
v. 16	10 39 21.36	+4.895	+10 29 46.9	−26.55	0.194 5394	−1018.3	3.23	5.62	18 57.8
17	10 41 18.49	4.865	10 19 10.7	26.47	0.192 0835	1028.2	3.24	5.65	18 55.8
18	10 43 14.90	4.835	10 8 36.4	26.39	0.189 6038	1038.2	3.27	5.69	18 53.8
19	10 45 10.59	4.805	9 58 4.1	26.30	0.187 1002	1048.2	3.28	5.72	18 51.8
20	10 47 5.53	4.774	9 47 33.9	26.21	0.184 5726	1058.1	3.30	5.75	18 49.8
21	10 48 59.73	+4.743	+ 9 37 6.1	−26.11	0.182 0211	−1068.1	3.32	5.79	18 47.7
22	10 50 53.18	4.712	9 26 40.7	26.00	0.179 4455	1078.2	3.34	5.82	18 45.7
23	10 52 45.87	4.680	9 16 18.0	25.89	0.176 8457	1088.3	3.36	5.86	18 43.6
24	10 54 37.81	4.648	9 5 57.9	25.78	0.174 2215	1098.5	3.38	5.89	18 41.5
25	10 56 28.98	4.616	8 55 40.7	25.66	0.171 5729	1108.7	3.40	5.93	18 39.4
26	10 58 19.39	+4.584	+ 8 45 26.5	−25.52	0.168 8996	−1119.1	3.42	5.96	18 37.3
27	11 0 9.02	4.552	8 35 15.6	25.39	0.166 2013	1129.5	3.44	6.00	18 35.2
28	11 1 57.86	4.519	8 25 7.9	25.25	0.163 4781	1139.9	3.47	6.04	18 33.0
29	11 3 45.91	4.486	8 15 3.7	25.10	0.160 7296	1150.5	3.49	6.08	18 30.9
30	11 5 33.16	4.452	8 5 3.1	24.95	0.157 9557	1161.1	3.51	6.12	18 28.7
c. 1	11 7 19.59	+4.418	+ 7 55 6.3	−24.79	0.155 1561	−1171.9	3.54	6.16	18 26.5
2	11 9 5.20	4.383	7 45 13.4	24.62	0.152 3307	1182.6	3.56	6.20	18 24.4
3	11 10 49.96	4.348	7 35 24.8	24.44	0.149 4793	1193.5	3.58	6.24	18 22.2
4	11 12 33.88	4.312	7 25 40.5	24.25	0.146 6016	1204.5	3.60	6.28	18 19.9
5	11 14 16.92	4.275	7 16 0.8	24.06	0.143 6975	1215.6	3.63	6.32	18 17.7
6	11 15 59.09	+4.238	+ 7 6 25.8	−23.86	0.140 7669	−1226.6	3.65	6.36	18 15.5
7	11 17 40.35	4.200	6 56 55.8	23.64	0.137 8097	1237.7	3.68	6.41	18 13.2
8	11 19 20.70	4.162	6 47 30.9	23.42	0.134 8259	1248.8	3.70	6.45	18 10.9
9	11 21 0.11	4.123	6 38 11.3	23.20	0.131 8153	1260.0	3.73	6.50	18 8.6
10	11 22 38.58	4.083	6 28 57.3	22.97	0.128 7781	1271.1	3.75	6.54	18 6.3
11	11 24 16.07	+4.042	+ 6 19 48.9	−22.73	0.125 7142	−1282.2	3.78	6.59	18 4.0
12	11 25 52.58	4.000	6 10 46.4	22.48	0.122 6236	1293.3	3.81	6.63	18 1.7
13	11 27 28.08	3.958	6 1 49.9	22.22	0.119 5064	1304.4	3.83	6.68	17 59.3
14	11 29 2.55	3.915	5 52 59.7	21.96	0.116 3626	1315.4	3.86	6.73	17 56.9
15	11 30 35.98	3.871	5 44 16.0	21.68	0.113 1924	1326.4	3.89	6.78	17 54.5
16	11 32 8.34	+3.826	+ 5 35 38.9	−21.40	0.109 9959	−1337.3	3.92	6.83	17 52.1
17	11 33 39.63	3.781	5 27 8.6	21.12	0.106 7732	1348.2	3.95	6.88	17 49.7
18	11 35 9.81	3.734	5 18 45.3	20.82	0.103 5244	1359.1	3.98	6.93	17 47.2
19	11 36 38.88	3.688	5 10 29.1	20.52	0.100 2497	1369.8	4.01	6.99	17 44.8
20	11 38 6.81	3.640	5 2 20.2	20.21	0.096 9493	1380.5	4.04	7.04	17 42.3
21	11 39 33.60	+3.592	+ 4 54 18.9	−19.90	0.093 6232	−1391.2	4.07	7.09	17 39.8
22	11 40 59.21	3.542	4 46 25.1	19.58	0.090 2715	1401.9	4.10	7.15	17 37.2
23	11 42 23.63	3.492	4 38 39.2	19.25	0.086 8943	1412.5	4.13	7.20	17 34.7
24	11 43 46.84	3.442	4 31 1.2	18.91	0.083 4917	1423.0	4.17	7.26	17 32.1
25	11 45 8.82	3.390	4 23 31.4	18.57	0.080 0638	1433.6	4.20	7.32	17 29.5
26	11 46 29.55	+3.337	+ 4 16 9.9	−18.22	0.076 6105	−1444.2	4.24	7.38	17 26.9
27	11 47 48.99	3.283	4 8 57.1	17.85	0.073 1319	1454.7	4.27	7.44	17 24.3
28	11 49 7.14	3.228	4 1 53.0	17.48	0.069 6282	1465.1	4.30	7.50	17 21.7
29	11 50 23.95	3.172	3 54 57.9	17.10	0.066 0993	1475.6	4.34	7.56	17 19.0
30	11 51 39.41	3.115	3 48 12.1	16.71	0.062 5455	1485.9	4.37	7.62	17 16.3
31	11 52 53.47	+3.056	+ 3 41 35.7	−16.31	0.058 9668	−1496.3	4.41	7.68	17 13.6
32	*11 54 6.11*	. . .	*+ 3 35 9.1*	. . .	0.055 3635	. . . .	4.45	7.75	17 10.8

FOR GREENWICH MEAN NOON.

Date.		Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
		° ′ ″	′ ″	″	° ′ ″	″		
Jan.	1	302 56 43.4	37 8.1	+28.5	−1 46 44.3	−19.8	0.145 9131	–
	3	304 11 4.0	37 12.4	26.5	1 47 22.4	18.3	0.145 4963	
	5	305 25 33.1	37 16.6	24.4	1 47 57.5	16.8	0.145 0942	
	7	306 40 10.3	37 20.6	22.3	1 48 29.7	15.3	0.144 7071	
	9	307 54 55.3	37 24.5	20.1	1 48 58.9	13.8	0.144 3353	
	11	309 9 48.0	37 28.2	+17.9	−1 49 25.0	−12.3	0.143 9789	–
	13	310 24 47.9	37 31.7	15.7	1 49 48.0	10.8	0.143 6383	
	15	311 39 54.7	37 35.1	13.5	1 50 8.0	9.2	0.143 3136	
	17	312 55 8.1	37 38.3	11.2	1 50 24.8	7.6	0.143 0051	
	19	314 10 27.8	37 41.4	8.9	1 50 38.5	6.0	0.142 7129	
	21	315 25 53.4	37 44.3	+ 6.5	−1 50 48.9	− 4.4	0.142 4374	–
	23	316 41 24.7	37 47.0	4.2	1 50 56.2	2.9	0.142 1786	
	25	317 57 1.1	37 49.5	+ 1.8	1 51 0.3	− 1.3	0.141 9367	
	27	319 12 42.5	37 51.8	− 0.5	1 51 1.2	+ 0.4	0.141 7119	
	29	320 28 28.3	37 54.0	2.9	1 50 58.8	2.0	0.141 5043	
	31	321 44 18.3	37 56.0	− 5.3	−1 50 53.2	+ 3.6	0.141 3141	–
Feb.	2	323 0 12.1	37 57.8	7.6	1 50 44.4	5.2	0.141 1414	
	4	324 16 9.3	37 59.4	10.0	1 50 32.3	6.9	0.140 9863	
	6	325 32 9.6	38 0.8	12.3	1 50 16.9	8.5	0.140 8490	
	8	326 48 12.5	38 2.1	14.6	1 49 58.4	10.1	0.140 7296	
	10	328 4 17.8	38 3.1	−16.9	−1 49 36.6	+11.7	0.140 6280	–
	12	329 20 24.9	38 4.0	19.1	1 49 11.6	13.3	0.140 5445	
	14	330 36 33.6	38 4.7	21.3	1 48 43.3	14.9	0.140 4790	
	16	331 52 43.5	38 5.2	23.5	1 48 11.8	16.5	0.140 4316	
	18	333 8 54.1	38 5.4	25.6	1 47 37.1	18.1	0.140 4023	
	20	334 25 5.1	38 5.5	−27.7	−1 46 59.3	+19.7	0.140 3912	–
	22	335 41 16.0	38 5.4	29.7	1 46 18.3	21.3	0.140 3982	+
	24	336 57 26.6	38 5.1	31.7	1 45 34.2	22.8	0.140 4235	
	26	338 13 36.4	38 4.6	33.6	1 44 46.9	24.4	0.140 4668	
	28	339 29 45.0	38 4.0	35.4	1 43 56.6	25.9	0.140 5282	
Mar.	2	340 45 52.1	38 3.1	−37.1	−1 43 3.3	+27.4	0.140 6077	+
	4	342 1 57.3	38 2.0	38.8	1 42 6.9	28.9	0.140 7052	
	6	343 18 0.1	38 0.8	40.4	1 41 7.6	30.4	0.140 8206	
	8	344 34 0.3	37 59.3	42.0	1 40 5.4	31.8	0.140 9540	
	10	345 49 57.3	37 57.7	43.4	1 39 0.3	33.3	0.141 1051	
	12	347 5 51.0	37 55.9	−44.8	−1 37 52.3	+34.7	0.141 2738	+
	14	348 21 40.8	37 53.9	46.0	1 36 41.5	36.1	0.141 4600	
	16	349 37 26.5	37 51.8	47.2	1 35 28.0	37.4	0.141 6637	
	18	350 53 7.7	37 49.4	48.3	1 34 11.8	38.8	0.141 8847	
	20	352 8 43.9	37 46.8	49.3	1 32 52.9	40.1	0.142 1228	
	22	353 24 14.9	37 44.1	−50.2	−1 31 31.4	+41.4	0.142 3779	+
	24	354 39 40.3	37 41.2	51.0	1 30 7.4	42.6	0.142 6497	
	26	355 54 59.8	37 38.2	51.7	1 28 40.9	43.9	0.142 9382	
	28	357 10 13.1	37 35.0	52.3	1 27 11.9	45.1	0.143 2431	
	30	358 25 19.7	37 31.6	52.8	1 25 40.6	46.3	0.143 5642	
Apr.	1	359 40 19.4	37 28.0	−53.2	−1 24 6.9	+47.4	0.143 9014	+
	3	0 55 11.8	37 24.3	−53.5	−1 22 31.1	+48.4	0.144 2543	+

FOR GREENWICH MEAN NOON.

te.	Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
	° ′ ″	′ ″	″	° ′ ″	″		
1	359 40 19.4	37 28.0	−53.2	−1 24 6.9	+47.4	0.143 9014	+1725
3	0 55 11.8	37 24.3	53.5	1 22 31.1	48.4	0.144 2543	1804
5	2 9 56.7	37 20.5	53.7	1 20 53.1	49.5	0.144 6228	1881
7	3 24 33.8	37 16.5	53.8	1 19 12.9	50.6	0.145 0066	1957
9	4 39 2.7	37 12.4	53.8	1 17 30.7	51.6	0.145 4054	2031
11	5 53 23.2	37 8.1	−53.6	−1 15 46.6	+52.6	0.145 8191	+2105
13	7 7 34.9	37 3.6	53.4	1 14 0.4	53.6	0.146 2473	2177
15	8 21 37.6	36 59.0	53.1	1 12 12.4	54.5	0.146 6897	2247
17	9 35 31.0	36 54.3	52.7	1 10 22.6	55.3	0.147 1462	2317
19	10 49 14.9	36 49.5	52.2	1 8 31.2	56.1	0.147 6164	2385
21	12 2 49.0	36 44.5	−51.6	−1 6 38.1	+57.0	0.148 1000	+2451
23	13 16 13.0	36 39.5	51.0	1 4 43.4	57.7	0.148 5967	2516
25	14 29 26.8	36 34.3	50.2	1 2 47.2	58.5	0.149 1062	2579
27	15 42 30.1	36 29.0	49.3	1 0 49.6	59.1	0.149 6283	2641
29	16 55 22.7	36 23.6	48.3	0 58 50.7	59.8	0.150 1625	2701
1	18 8 4.3	36 18.0	−47.3	−0 56 50.5	+60.4	0.150 7086	+2760
3	19 20 34.7	36 12.4	46.2	0 54 49.1	61.0	0.151 2663	2817
5	20 32 53.8	36 6.7	45.0	0 52 46.5	61.6	0.151 8353	2872
7	21 45 1.3	36 0.8	43.7	0 50 42.8	62.1	0.152 4151	2926
9	22 56 57.0	35 54.9	42.4	0 48 38.1	62.6	0.153 0056	2979
11	24 8 41.0	35 49.0	−40.9	−0 46 32.5	+63.0	0.153 6064	+3029
13	25 20 12.9	35 42.9	39.4	0 44 26.1	63.4	0.154 2170	3077
15	26 31 32.5	35 36.7	37.9	0 42 18.8	63.8	0.154 8372	3124
17	27 42 39.8	35 30.6	36.3	0 40 10.8	64.2	0.155 4667	3170
19	28 53 34.7	35 24.3	34.6	0 38 2.2	64.5	0.156 1051	3214
21	30 4 16.8	35 17.9	−32.9	−0 35 53.0	+64.7	0.156 7520	+3256
23	31 14 46.3	35 11.5	31.1	0 33 43.3	65.0	0.157 4072	3296
25	32 25 2.9	35 5.1	29.3	0 31 33.1	65.2	0.158 0703	3335
27	33 35 6.5	34 58.5	27.4	0 29 22.5	65.4	0.158 7409	3372
29	34 44 57.0	34 52.0	25.5	0 27 11.6	65.5	0.159 4188	3407
31	35 54 34.4	34 45.4	−23.6	−0 25 0.4	+65.6	0.160 1035	+3440
2	37 3 58.4	34 38.7	21.6	0 22 49.1	65.7	0.160 7947	3472
4	38 13 9.2	34 32.1	19.6	0 20 37.6	65.8	0.161 4922	3502
6	39 22 6.6	34 25.3	17.6	0 18 26.1	65.8	0.162 1955	3531
8	40 30 50.5	34 18.6	15.6	0 16 14.5	65.8	0.162 9044	3558
10	41 39 21.0	34 11.8	−13.5	−0 14 2.9	+65.8	0.163 6184	+3583
12	42 47 37.8	34 5.0	11.4	0 11 51.5	65.7	0.164 3373	3606
14	43 55 41.0	33 58.2	9.3	0 9 40.2	65.6	0.165 0607	3628
16	45 3 30.7	33 51.4	7.2	0 7 29.1	65.5	0.165 7883	3648
18	46 11 6.6	33 44.5	5.1	0 5 18.3	65.3	0.166 5198	3667
20	47 18 28.9	33 37.7	− 3.0	−0 3 7.8	+65.2	0.167 2549	+3684
22	48 25 37.5	33 30.9	− 0.9	−0 0 57.7	64.9	0.167 9932	3699
24	49 32 32.4	33 24.0	+ 1.1	+0 1 11.9	64.7	0.168 7345	3713
26	50 39 13.6	33 17.2	3.2	0 3 21.2	64.5	0.169 4783	3725
28	51 45 41.1	33 10.3	5.3	0 5 29.9	64.2	0.170 2245	3736
30	52 51 54.8	33 3.5	+ 7.4	+0 7 38.0	+63.9	0.170 9728	+3746
2	53 57 55.0	32 56.6	+ 9.4	+0 9 45.6	+63.6	0.171 7227	+3753

FOR GREENWICH MEAN NOON.

Date.		Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	I R
		° ′ ″	′ ″	″	° ′ ″	″	
July	2	53 57 55.0	32 56.6	+ 9.4	+0 9 45.6	+63.6	(
	4	55 3 41.4	32 49.8	11.4	0 11 52.4	63.2	(
	6	56 9 14.3	32 43.0	13.4	0 13 58.6	62.9	(
	8	57 14 33.5	32 36.2	15.4	0 16 4.0	62.5	(
	10	58 19 39.2	32 29.5	17.3	0 18 8.7	62.1	(
	12	59 24 31.4	32 22.7	+19.2	+0 20 12.5	+61.7	(
	14	60 29 10.2	32 16.0	21.1	0 22 15.5	61.2	(
	16	61 33 35.5	32 9.3	23.0	0 24 17.5	60.8	(
	18	62 37 47.5	32 2.6	24.8	0 26 18.7	60.3	(
	20	63 41 46.1	31 56.0	26.5	0 28 18.9	59.9	(
	22	64 45 31.4	31 49.4	+28.2	+0 30 18.1	+59.3	(
	24	65 49 3.7	31 42.8	29.9	0 32 16.2	58.8	(
	26	66 52 22.8	31 36.3	31.5	0 34 13.3	58.3	(
	28	67 55 29.0	31 29.8	33.1	0 36 9.3	57.7	(
	30	68 58 22.2	31 23.4	34.6	0 38 4.1	57.1	(
Aug.	1	70 1 2.6	31 17.0	+36.1	+0 39 57.8	+56.6	(
	3	71 3 30.2	31 10.6	37.6	0 41 50.3	56.0	(
	5	72 5 45.1	31 4.3	38.9	0 43 41.6	55.4	(
	7	73 7 47.4	30 58.0	40.2	0 45 31.7	54.8	(
	9	74 9 37.3	30 51.8	41.5	0 47 20.6	54.1	(
	11	75 11 14.7	30 45.7	+42.7	+0 49 8.2	+53.5	(
	13	76 12 40.0	30 39.6	43.8	0 50 54.5	52.8	(
	15	77 13 53.0	30 33.5	44.9	0 52 39.4	52.1	(
	17	78 14 53.9	30 27.5	45.9	0 54 23.0	51.5	(
	19	79 15 42.9	30 21.6	46.9	0 56 5.2	50.8	(
	21	80 16 20.1	30 15.6	+47.8	+0 57 46.0	+50.1	(
	23	81 16 45.4	30 9.8	48.6	0 59 25.5	49.4	(
	25	82 16 59.3	30 4.0	49.4	1 1 3.5	48.7	(
	27	83 17 1.6	29 58.3	50.1	1 2 40.1	48.0	(
	29	84 16 52.5	29 52.6	50.8	1 4 15.3	47.2	(
	31	85 16 32.2	29 47.1	+51.4	+1 5 49.0	+46.5	(
Sept.	2	86 16 0.8	29 41.5	51.9	1 7 21.2	45.7	(
	4	87 15 18.4	29 36.1	52.3	1 8 51.9	45.0	(
	6	88 14 25.1	29 30.7	52.7	1 10 21.1	44.2	(
	8	89 13 21.1	29 25.3	53.1	1 11 48.8	43.5	(
	10	90 12 6.4	29 20.0	+53.3	+1 13 15.0	+42.7	(
	12	91 10 41.3	29 14.9	53.5	1 14 39.7	41.9	(
	14	92 9 5.9	29 9.7	53.7	1 16 2.7	41.2	(
	16	93 7 20.2	29 4.6	53.8	1 17 24.3	40.4	(
	18	94 5 24.5	28 59.6	53.8	1 18 44.3	39.6	(
	20	95 3 18.8	28 54.7	+53.7	+1 20 2.7	+38.8	(
	22	96 1 3.3	28 49.8	53.6	1 21 19.6	38.0	(
	24	96 58 38.2	28 45.1	53.5	1 22 34.8	37.2	(
	26	97 56 3.6	28 40.3	53.3	1 23 48.5	36.4	(
	28	98 53 19.6	28 35.7	53.0	1 25 0.5	35.6	(
	30	99 50 26.3	28 31.1	+52.6	+1 26 10.9	+34.8	(
	2	100 47 24.0	28 26.6	+52.2	+1 27 19.8	+34.0	(

FOR GREENWICH MEAN NOON.

Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
° ′ ″	′ ″	″	° ′ ″	″		
100 47 24.0	28 26.6	+52.2	+1 27 19.8	+34.0	0.203 7563	+2863
101 44 12.8	28 22.2	51.8	1 28 27.1	33.2	0.204 3251	2824
102 40 52.7	28 17.8	51.3	1 29 32.7	32.4	0.204 8859	2785
103 37 24.0	28 13.5	50.7	1 30 36.7	31.6	0.205 4389	2745
104 33 46.8	28 9.3	50.1	1 31 39.0	30.8	0.205 9839	2705
105 30 1.2	28 5.1	+49.4	+1 32 39.7	+29.9	0.206 5207	+2664
106 26 7.4	28 1.1	48.7	1 33 38.7	29.1	0.207 0494	2623
107 22 5.5	27 57.1	48.0	1 34 36.2	28.3	0.207 5697	2581
108 17 55.7	27 53.1	47.2	1 35 32.0	27.5	0.208 0817	2539
109 13 38.1	27 49.3	46.3	1 36 26.2	26.7	0.208 5851	2496
110 9 12.9	27 45.5	+45.4	+1 37 18.8	+25.9	0.209 0801	+2453
111 4 40.1	27 41.8	44.4	1 38 9.8	25.1	0.209 5663	2409
112 0 0.1	27 38.2	43.4	1 38 59.1	24.2	0.210 0438	2365
112 55 12.9	27 34.6	42.4	1 39 46.7	23.4	0.210 5125	2322
113 50 18.7	27 31.2	41.3	1 40 32.7	22.6	0.210 9724	2277
114 45 17.6	27 27.7	+40.2	+1 41 17.1	+21.8	0.211 4233	+2232
115 40 9.7	27 24.4	39.0	1 41 59.9	21.0	0.211 8651	2187
116 34 55.3	27 21.2	37.8	1 42 40.9	20.1	0.212 2979	2141
117 29 34.4	27 18.0	36.6	1 43 20.4	19.3	0.212 7215	2096
118 24 7.2	27 14.9	35.3	1 43 58.2	18.5	0.213 1359	2049
119 18 33.9	27 11.9	+34.0	+1 44 34.4	+17.7	0.213 5410	+2002
120 12 54.7	27 8.9	32.7	1 45 9.0	16.9	0.213 9368	1955
121 7 9.5	27 6.0	31.3	1 45 41.9	16.0	0.214 3232	1908
122 1 18.7	27 3.2	29.9	1 46 13.1	15.2	0.214 7001	1861
122 55 22.4	27 0.5	28.5	1 46 42.7	14.4	0.215 0675	1813
123 49 20.7	26 57.8	+27.0	+1 47 10.7	+13.6	0.215 4254	+1765
124 43 13.7	26 55.2	25.6	1 47 37.1	12.8	0.215 7737	1717
125 37 1.7	26 52.7	24.1	1 48 1.8	12.0	0.216 1123	1669
126 30 44.6	26 50.2	22.6	1 48 25.0	11.2	0.216 4412	1620
127 24 22.8	26 48.0	21.1	1 48 46.6	10.4	0.216 7602	1571
128 17 56.5	26 45.7	+19.5	+1 49 6.4	+ 9.5	0.217 0696	+1522
129 11 25.6	26 43.5	17.9	1 49 24.7	8.8	0.217 3691	1473
130 4 50.4	26 41.3	16.3	1 49 41.4	8.0	0.217 6587	1423
130 58 11.0	26 39.3	14.7	1 49 56.5	7.2	0.217 9384	1374
131 51 27.6	26 37.3	13.1	1 50 10.0	6.4	0.218 2082	1324
132 44 40.2	26 35.4	+11.5	+1 50 21.9	+ 5.6	0.218 4681	+1274
133 37 49.1	26 33.6	9.9	1 50 32.2	4.8	0.218 7178	1224
134 30 54.5	26 31.8	8.2	1 50 40.9	4.0	0.218 9576	1174
135 23 56.4	26 30.1	6.6	1 50 48.0	3.2	0.219 1873	1123
136 16 55.0	26 28.5	5.0	1 50 53.5	2.4	0.219 4069	1073
137 9 50.5	26 27.0	+ 3.3	+1 50 57.5	+ 1.6	0.219 6164	+1022
138 2 43.0	26 25.5	+ 1.6	1 50 59.9	+ 0.8	0.219 8157	971
138 55 32.7	26 24.2	0.0	1 51 0.7	0.0	0.220 0048	920
139 48 19.7	26 22.9	− 1.6	1 50 59.8	− 0.8	0.220 1838	869
140 41 4.2	26 21.6	3.3	1 50 57.5	1.6	0.220 3525	818
141 33 46.3	26 20.5	− 4.9	+1 50 53.5	− 2.4	0.220 5110	+ 767
142 26 26.1	26 19.4	− 6.6	+1 50 48.1	− 3.1	0.220 6592	+ 715

GREENWICH MEAN TIME.

Date.		Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Polar Semi-diameter.	Hor. Parallax.
		Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.
		h m s	s	° ′ ″	″			″	″
Jan.	1	1 36 58.03	+0.356	+ 8 45 15.9	+2.89	0.665 0022	+607.4	20.36	1.90
	2	1 37 6.97	0.388	8 46 27.5	3.07	0.666 4607	607.9	20.29	1.90
	3	1 37 16.67	0.420	8 47 43.4	3.25	0.667 9203	608.3	20.22	1.89
	4	1 37 27.12	0.451	8 49 3.5	3.43	0.669 3806	608.6	20.15	1.88
	5	1 37 38.32	0.482	8 50 27.8	3.60	0.670 8412	608.6	20.08	1.88
	6	1 37 50.26	+0.513	+ 8 51 56.4	+3.78	0.672 3015	+608.4	20.02	1.87
	7	1 38 2.94	0.544	8 53 29.1	3.96	0.673 7612	608.0	19.95	1.87
	8	1 38 16.35	0.574	8 55 5.9	4.12	0.675 2199	607.5	19.88	1.86
	9	1 38 30.49	0.604	8 56 46.7	4.28	0.676 6772	606.9	19.82	1.85
	10	1 38 45.36	0.634	8 58 31.6	4.45	0.678 1327	606.1	19.75	1.85
	11	1 39 0.94	+0.664	+ 9 0 20.5	+4.62	0.679 5862	+605.1	19.68	1.84
	12	1 39 17.24	0.694	9 2 13.3	4.78	0.681 0371	604.0	19.62	1.83
	13	1 39 34.24	0.723	9 4 9.9	4.94	0.682 4852	602.7	19.55	1.83
	14	1 39 51.94	0.752	9 6 10.5	5.10	0.683 9301	601.3	19.49	1.82
	15	1 40 10.34	0.781	9 8 14.8	5.26	0.685 3713	599.7	19.42	1.82
	16	1 40 29.43	+0.810	+ 9 10 23.0	+5.42	0.686 8087	+598.0	19.36	1.81
	17	1 40 49.21	0.838	9 12 34.7	5.57	0.688 2418	596.2	19.29	1.80
	18	1 41 9.67	0.866	9 14 50.2	5.72	0.689 6703	594.2	19.23	1.80
	19	1 41 30.80	0.894	9 17 9.3	5.87	0.691 0939	592.1	19.17	1.79
	20	1 41 52.60	0.922	9 19 32.1	6.02	0.692 5122	589.8	19.11	1.79
	21	1 42 15.06	+0.950	+ 9 21 58.3	+6.17	0.693 9249	+587.4	19.04	1.78
	22	1 42 38.18	0.977	9 24 28.1	6.32	0.695 3317	584.9	18.98	1.77
	23	1 43 1.96	1.004	9 27 1.4	6.46	0.696 7322	582.2	18.92	1.77
	24	1 43 26.38	1.031	9 29 38.0	6.59	0.698 1260	579.3	18.86	1.76
	25	1 43 51.44	1.057	9 32 17.9	6.73	0.699 5129	576.4	18.80	1.76
	26	1 44 17.13	+1.084	+ 9 35 1.1	+6.87	0.700 8926	+573.3	18.74	1.75
	27	1 44 43.45	1.109	9 37 47.5	7.00	0.702 2647	570.1	18.68	1.75
	28	1 45 10.38	1.135	9 40 37.1	7.13	0.703 6290	566.8	18.62	1.74
	29	1 45 37.91	1.160	9 43 29.7	7.26	0.704 9853	563.4	18.56	1.74
	30	1 46 6.04	1.184	9 46 25.4	7.38	0.706 3333	559.9	18.51	1.73
	31	1 46 34.77	+1.209	+ 9 49 24.1	+7.51	0.707 6728	+556.3	18.45	1.72
Feb.	1	1 47 4.07	1.233	9 52 25.7	7.62	0.709 0035	552.6	18.39	1.72
	2	1 47 33.95	1.257	9 55 30.1	7.74	0.710 3252	548.8	18.34	1.71
	3	1 48 4.41	1.281	9 58 37.3	7.86	0.711 6377	544.9	18.28	1.71
	4	1 48 35.42	1.304	10 1 47.3	7.97	0.712 9408	541.0	18.23	1.70
	5	1 49 6.99	+1.327	+10 4 59.9	+8.08	0.714 2343	+536.9	18.17	1.70
	6	1 49 39.11	1.350	10 8 15.2	8.19	0.715 5181	532.9	18.12	1.69
	7	1 50 11.77	1.372	10 11 33.1	8.30	0.716 7921	528.8	18.07	1.69
	8	1 50 44.96	1.394	10 14 53.5	8.40	0.718 0561	524.5	18.01	1.68
	9	1 51 18.67	1.416	10 18 16.4	8.50	0.719 3098	520.2	17.96	1.68
	10	1 51 52.91	+1.437	+10 21 41.7	+8.60	0.720 5531	+515.9	17.91	1.67
	11	1 52 27.66	1.459	10 25 9.4	8.70	0.721 7859	511.4	17.86	1.67
	12	1 53 2.92	1.480	10 28 39.4	8.80	0.723 0079	506.9	17.81	1.66
	13	1 53 38.68	1.500	10 32 11.8	8.89	0.724 2192	502.4	17.76	1.66
	14	1 54 14.94	1.521	10 35 46.3	8.98	0.725 4195	497.8	17.71	1.66
	15	1 54 51.69	+1.541	+10 39 23.0	+9.07	0.726 6087	+493.1	17.66	1.65
	16	1 55 28.92	+1.561	+10 43 1.9	+9.16	0.727 7866	+488.4	17.62	1.65

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension. Noon.	Var. per Hour. Noon.	Apparent Declination. Noon.	Var. per Hour. Noon.	Logarithm of Distance from Earth. Noon.	Var. per Hour. Noon.	Polar Semi-diameter. Noon.	Hor. Parallax. Noon.	Transit. Meridian of Greenwich.
	h m s	s	° ′ ″	″			″	″	h m
16	1 55 28.92	+1.561	+10 43 1.9	+ 9.16	0.727 7866	+488.4	17.62	1.65	4 11.3
17	1 56 6.62	1.581	10 46 42.8	9.25	0.728 9530	483.6	17.57	1.64	4 8.0
18	1 56 44.79	1.600	10 50 25.8	9.33	0.730 1079	478.8	17.52	1.64	4 4.7
19	1 57 23.44	1.620	10 54 10.8	9.41	0.731 2510	473.8	17.48	1.63	4 1.4
20	1 58 2.55	1.639	10 57 57.7	9.49	0.732 3821	468.8	17.43	1.63	3 58.1
21	1 58 42.10	+1.657	+11 1 46.4	+ 9.57	0.733 5011	+463.7	17.38	1.63	3 54.8
22	1 59 22.10	1.676	11 5 36.9	9.64	0.734 6078	458.5	17.34	1.62	3 51.6
23	2 0 2.54	1.694	11 9 29.2	9.71	0.735 7021	453.3	17.30	1.62	3 48.3
24	2 0 43.40	1.711	11 13 23.2	9.78	0.736 7839	448.1	17.25	1.61	3 45.1
25	2 1 24.69	1.729	11 17 18.8	9.85	0.737 8530	442.8	17.21	1.61	3 41.8
26	2 2 6.40	+1.746	+11 21 16.0	+ 9.91	0.738 9094	+437.5	17.17	1.60	3 38.6
27	2 2 48.52	1.763	11 25 14.7	9.98	0.739 9530	432.1	17.13	1.60	3 35.3
28	2 3 31.04	1.780	11 29 15.0	10.04	0.740 9836	426.7	17.09	1.60	3 32.1
r. 1	2 4 13.96	1.796	11 33 16.7	10.10	0.742 0013	421.3	17.05	1.59	3 28.9
2	2 4 57.26	1.812	11 37 19.7	10.15	0.743 0059	415.8	17.01	1.59	3 25.7
3	2 5 40.94	+1.828	+11 41 24.1	+10.21	0.743 9972	+410.3	16.97	1.59	3 22.5
4	2 6 25.00	1.843	11 45 29.7	10.26	0.744 9754	404.8	16.93	1.58	3 19.3
5	2 7 9.42	1.858	11 49 36.5	10.31	0.745 9403	399.3	16.89	1.58	3 16.1
6	2 7 54.20	1.873	11 53 44.5	10.36	0.746 8920	393.8	16.86	1.58	3 12.9
7	2 8 39.34	1.888	11 57 53.7	10.40	0.747 8305	388.2	16.82	1.57	3 9.7
8	2 9 24.84	+1.903	+12 2 3.9	+10.45	0.748 7556	+382.7	16.79	1.57	3 6.5
9	2 10 10.68	1.917	12 6 15.2	10.49	0.749 6673	377.1	16.75	1.57	3 3.4
10	2 10 56.85	1.931	12 10 27.4	10.53	0.750 5655	371.4	16.72	1.56	3 0.2
11	2 11 43.36	1.944	12 14 40.6	10.57	0.751 4501	365.8	16.68	1.56	2 57.0
12	2 12 30.19	1.958	12 18 54.7	10.61	0.752 3211	360.1	16.65	1.56	2 53.9
13	2 13 17.35	+1.972	+12 23 9.7	+10.64	0.753 1784	+354.4	16.62	1.55	2 50.7
14	2 14 4.83	1.985	12 27 25.4	10.67	0.754 0220	348.7	16.58	1.55	2 47.6
15	2 14 52.62	1.998	12 31 42.0	10.71	0.754 8519	342.9	16.55	1.55	2 44.4
16	2 15 40.72	2.010	12 35 59.3	10.74	0.755 6680	337.2	16.52	1.54	2 41.3
17	2 16 29.12	2.023	12 40 17.3	10.76	0.756 4703	331.4	16.49	1.54	2 38.2
18	2 17 17.82	+2.035	+12 44 36.0	+10.79	0.757 2586	+325.6	16.46	1.54	2 35.1
19	2 18 6.82	2.047	12 48 55.3	10.82	0.758 0330	319.8	16.43	1.54	2 32.0
20	2 18 56.10	2.059	12 53 15.1	10.84	0.758 7934	313.9	16.40	1.53	2 28.8
21	2 19 45.67	2.071	12 57 35.4	10.86	0.759 5396	308.0	16.37	1.53	2 25.7
22	2 20 35.51	2.082	13 1 56.2	10.88	0.760 2717	302.1	16.35	1.53	2 22.6
23	2 21 25.62	+2.093	+13 6 17.5	+10.89	0.760 9895	+296.1	16.32	1.53	2 19.5
24	2 22 16.00	2.104	13 10 39.1	10.91	0.761 6929	290.1	16.29	1.52	2 16.4
25	2 23 6.64	2.115	13 15 1.1	10.92	0.762 3821	284.1	16.27	1.52	2 13.3
26	2 23 57.52	2.125	13 19 23.3	10.93	0.763 0568	278.1	16.24	1.52	2 10.2
27	2 24 48.65	2.135	13 23 45.8	10.94	0.763 7171	272.1	16.22	1.52	2 7.2
28	2 25 40.02	+2.145	+13 28 8.4	+10.95	0.764 3631	+266.1	16.19	1.51	2 4.1
29	2 26 31.63	2.155	13 32 31.2	10.95	0.764 9946	260.1	16.17	1.51	2 1.0
30	2 27 23.45	2.164	13 36 54.2	10.96	0.765 6117	254.1	16.15	1.51	1 57.9
31	2 28 15.50	2.173	13 41 17.2	10.96	0.766 2144	248.1	16.12	1.51	1 54.9
pr. 1	2 29 7.77	2.182	13 45 40.3	10.96	0.766 8028	242.2	16.10	1.51	1 51.8
2	2 30 0.25	+2.191	+13 50 3.4	+10.96	0.767 3768	+236.2	16.08	1.50	1 48.7
3	2 30 52.94	+2.200	+13 54 26.5	+10.96	0.767 9363	+230.1	16.06	1.50	1 45.7

GREENWICH MEAN TIME.

Date.		Apparent Right Ascension. Noon.	Var. per Hour. Noon.	Apparent Declination. Noon.	Var. per Hour. Noon.	Logarithm of Distance from Earth. Noon.	Var. per Hour. Noon.	Polar Semi-diameter. Noon.	Hor. Parallax. Noon.
		h m s	s	° ′ ″	″			″	″
Apr.	1	2 29 7.77	+2.182	+13 45 40.3	+10.96	0.766 8028	+242.2	16.10	1.51
	2	2 30 0.25	2.191	13 50 3.4	10.96	0.767 3768	236.2	16.08	1.50
	3	2 30 52.94	2.200	13 54 26.5	10.96	0.767 9363	230.1	16.06	1.50
	4	2 31 45.83	2.208	13 58 49.5	10.96	0.768 4814	224.1	16.04	1.50
	5	2 32 38.92	2.216	14 3 12.4	10.95	0.769 0121	218.1	16.02	1.50
	6	2 33 32.20	+2.224	+14 7 35.1	+10.94	0.769 5284	+212.1	16.00	1.50
	7	2 34 25.66	2.231	14 11 57.7	10.94	0.770 0303	206.1	15.98	1.49
	8	2 35 19.31	2.239	14 16 20.1	10.93	0.770 5179	200.2	15.96	1.49
	9	2 36 13.14	2.247	14 20 42.2	10.92	0.770 9911	194.2	15.95	1.49
	10	2 37 7.15	2.254	14 25 4.1	10.91	0.771 4500	188.2	15.93	1.49
	11	2 38 1.32	+2.261	+14 29 25.7	+10.89	0.771 8944	+182.2	15.91	1.49
	12	2 38 55.66	2.268	14 33 46.9	10.88	0.772 3244	176.2	15.90	1.49
	13	2 39 50.15	2.274	14 38 7.8	10.86	0.772 7400	170.1	15.88	1.48
	14	2 40 44.81	2.281	14 42 28.3	10.84	0.773 1411	164.1	15.87	1.48
	15	2 41 39.62	2.287	14 46 48.3	10.82	0.773 5277	158.1	15.85	1.48
	16	2 42 34.58	+2.293	+14 51 7.9	+10.81	0.773 8999	+152.1	15.84	1.48
	17	2 43 29.69	2.299	14 55 27.0	10.79	0.774 2576	146.0	15.83	1.48
	18	2 44 24.94	2.305	14 59 45.6	10.76	0.774 6007	139.9	15.82	1.48
	19	2 45 20.32	2.311	15 4 3.7	10.74	0.774 9292	133.8	15.80	1.48
	20	2 46 15.84	2.316	15 8 21.1	10.71	0.775 2431	127.8	15.79	1.48
	21	2 47 11.48	+2.321	+15 12 37.9	+10.69	0.775 5424	+121.7	15.78	1.48
	22	2 48 7.23	2.325	15 16 54.1	10.66	0.775 8270	115.5	15.77	1.47
	23	2 49 3.10	2.330	15 21 9.5	10.63	0.776 0970	109.5	15.76	1.47
	24	2 49 59.07	2.334	15 25 24.2	10.60	0.776 3524	103.4	15.75	1.47
	25	2 50 55.15	2.338	15 29 38.1	10.56	0.776 5932	97.3	15.74	1.47
	26	2 51 51.32	+2.342	+15 33 51.2	+10.53	0.776 8195	+ 91.2	15.73	1.47
	27	2 52 47.59	2.346	15 38 3.5	10.50	0.777 0311	85.1	15.73	1.47
	28	2 53 43.94	2.350	15 42 15.0	10.46	0.777 2282	79.1	15.72	1.47
	29	2 54 40.38	2.353	15 46 25.6	10.42	0.777 4108	73.1	15.71	1.47
	30	2 55 36.89	2.356	15 50 35.3	10.39	0.777 5789	67.0	15.71	1.47
May	1	2 56 33.47	+2.359	+15 54 44.1	+10.35	0.777 7325	+ 61.0	15.70	1.47
	2	2 57 30.12	2.362	15 58 52.0	10.31	0.777 8716	55.0	15.70	1.47
	3	2 58 26.83	2.364	16 2 58.8	10.26	0.777 9963	49.0	15.69	1.47
	4	2 59 23.60	2.367	16 7 4.7	10.22	0.778 1067	42.9	15.69	1.47
	5	3 0 20.43	2.369	16 11 9.5	10.18	0.778 2027	37.0	15.68	1.47
	6	3 1 17.31	+2.371	+16 15 13.3	+10.14	0.778 2845	+ 31.1	15.68	1.47
	7	3 2 14.24	2.373	16 19 16.0	10.09	0.778 3519	25.1	15.68	1.47
	8	3 3 11.22	2.375	16 23 17.6	10.04	0.778 4051	19.2	15.68	1.47
	9	3 4 8.23	2.376	16 27 18.1	10.00	0.778 4439	13.2	15.68	1.47
	10	3 5 5.27	2.378	16 31 17.5	9.95	0.778 4684	7.3	15.68	1.47
	11	3 6 2.35	+2.379	+16 35 15.7	+ 9.90	0.778 4787	+ 1.3	15.67	1.47
	12	3 6 59.45	2.380	16 39 12.8	9.85	0.778 4746	− 4.7	15.67	1.47
	13	3 7 56.57	2.381	16 43 8.7	9.80	0.778 4562	10.6	15.68	1.47
	14	3 8 53.72	2.381	16 47 3.3	9.75	0.778 4235	16.6	15.68	1.47
	15	3 9 50.88	2.382	16 50 56.7	9.70	0.778 3764	22.6	15.68	1.47
	16	3 10 48.05	+2.382	+16 54 48.9	+ 9.65	0.778 3150	− 28.6	15.68	1.47
	17	3 11 45.23	+2.382	+16 58 39.8	+ 9.59	0.778 2392	− 34.6	15.68	1.47

MEAN TIME.

G MEAN TIME.

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Polar Semi-diameter.	Hor. Parallax.
	Noon.	*Noon.*	*Noon.*	*Noon.*	*Noon.*	*Noon.*	*Noon.*	*Noon.*
	h m s	s	° ′ ″	″			″	″
Oct. 1	4 40 27.50	−0.028	+21 16 36.2	−0.21	0.653 8271	−547.2	20.89	1.95
2	4 40 26.41	0.063	21 16 30.5	0.27	0.652 5178	543.9	20.95	1.96
3	4 40 24.46	0.099	21 16 23.2	0.34	0.651 2163	540.6	21.01	1.96
4	4 40 21.66	0.135	21 16 14.3	0.40	0.649 9232	537.0	21.07	1.97
5	4 40 18.00	0.170	21 16 3.9	0.47	0.648 6390	533.1	21.14	1.98
6	4 40 13.48	−0.206	+21 15 51.8	−0.53	0.647 3644	−529.0	21.20	1.98
7	4 40 8.11	0.242	21 15 38.2	0.60	0.646 0998	524.7	21.26	1.99
8	4 40 1.87	0.278	21 15 23.1	0.66	0.644 8459	520.2	21.32	1.99
9	4 39 54.77	0.314	21 15 6.4	0.73	0.643 6032	515.4	21.38	2.00
10	4 39 46.82	0.349	21 14 48.1	0.79	0.642 3724	510.3	21.44	2.00
11	4 39 38.01	−0.385	+21 14 28.3	−0.86	0.641 1540	−505.1	21.50	2.01
12	4 39 28.35	0.420	21 14 6.9	0.92	0.639 9487	499.4	21.56	2.02
13	4 39 17.85	0.455	21 13 44.0	0.99	0.638 7570	493.6	21.62	2.02
14	4 39 6.50	0.490	21 13 19.5	1.05	0.637 5796	487.5	21.68	2.03
15	4 38 54.32	0.525	21 12 53.5	1.12	0.636 4172	481.1	21.74	2.03
16	4 38 41.31	−0.559	+21 12 25.9	−1.18	0.635 2703	−474.5	21.80	2.04
17	4 38 27.47	0.594	21 11 56.8	1.24	0.634 1396	467.7	21.85	2.04
18	4 38 12.82	0.628	21 11 26.3	1.31	0.633 0256	460.6	21.91	2.05
19	4 37 57.35	0.661	21 10 54.1	1.37	0.631 9291	453.2	21.96	2.05
20	4 37 41.09	0.694	21 10 20.5	1.43	0.630 8506	445.5	22.02	2.06
21	4 37 24.04	−0.726	+21 9 45.3	−1.50	0.629 7907	−437.7	22.07	2.06
22	4 37 6.22	0.759	21 9 8.7	1.56	0.628 7501	429.5	22.13	2.07
23	4 36 47.62	0.791	21 8 30.5	1.62	0.627 7292	421.2	22.18	2.07
24	4 36 28.27	0.822	21 7 50.9	1.68	0.626 7287	412.6	22.23	2.08
25	4 36 8.18	0.852	21 7 9.9	1.74	0.625 7491	403.7	22.28	2.08
26	4 35 47.36	−0.882	+21 6 27.4	−1.80	0.624 7910	−394.7	22.33	2.09
27	4 35 25.82	0.912	21 5 43.5	1.86	0.623 8548	385.4	22.38	2.09
28	4 35 3.58	0.941	21 4 58.1	1.92	0.622 9413	375.9	22.43	2.10
29	4 34 40.65	0.970	21 4 11.2	1.98	0.622 0508	366.2	22.47	2.10
30	4 34 17.04	0.998	21 3 23.0	2.04	0.621 1839	356.2	22.52	2.11
31	4 33 52.76	−1.025	+21 2 33.4	−2.10	0.620 3411	−346.1	22.56	2.11
Nov. 1	4 33 27.84	1.052	21 1 42.4	2.15	0.619 5230	335.8	22.60	2.11
2	4 33 2.28	1.078	21 0 50.1	2.21	0.618 7301	325.0	22.64	2.12
3	4 32 36.10	1.104	20 59 56.5	2.26	0.617 9630	314.2	22.68	2.12
4	4 32 9.32	1.128	20 59 1.6	2.31	0.617 2221	303.2	22.72	2.12
5	4 31 41.96	−1.152	+20 58 5.4	−2.37	0.616 5080	−291.9	22.76	2.13
6	4 31 14.03	1.175	20 57 7.9	2.42	0.615 8212	280.4	22.80	2.13
7	4 30 45.55	1.198	20 56 9.1	2.47	0.615 1622	268.7	22.83	2.13
8	4 30 16.54	1.219	20 55 9.1	2.52	0.614 5315	256.8	22.86	2.14
9	4 29 47.03	1.240	20 54 7.9	2.57	0.613 9296	244.7	22.90	2.14
10	4 29 17.03	−1.260	+20 53 5.5	−2.62	0.613 3570	−232.4	22.93	2.14
11	4 28 46.56	1.279	20 52 1.9	2.67	0.612 8141	219.9	22.95	2.15
12	4 28 15.65	1.297	20 50 57.3	2.71	0.612 3014	207.3	22.98	2.15
13	4 27 44.33	1.313	20 49 51.7	2.75	0.611 8192	194.5	23.01	2.15
14	4 27 12.61	1.329	20 48 45.1	2.79	0.611 3680	181.5	23.03	2.15
15	4 26 40.52	−1.344	+20 47 37.6	−2.83	0.610 9481	−168.4	23.05	2.16
16	4 26 8.08	−1.358	+20 46 29.1	−2.87	0.610 5600	−155.1	23.07	2.16

GREENWICH MEAN TIME.

	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Polar Semi-diameter.	Hor. Parallax.	Transit, Meridian of Greenwich.
	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″			″	″	h m
16	4 26 8.08	−1.358	+20 46 29.1	−2.87	0.610 5600	−155.1	23.07	2.16	12 43.8
17	4 25 35.32	1.371	20 45 19.8	2.91	0.610 2038	141.7	23.09	2.16	12 39.3
18	4 25 2.27	1.382	20 44 9.6	2.94	0.609 8800	128.1	23.11	2.16	12 34.9
19	4 24 28.96	1.393	20 42 58.7	2.97	0.609 5887	114.6	23.13	2.16	12 30.4
20	4 23 55.40	1.403	20 41 47.0	3.00	0.609 3301	100.9	23.14	2.16	12 25.9
21	4 23 21.64	−1.411	+20 40 34.6	−3.03	0.609 1044	− 87.1	23.15	2.16	12 21.4
22	4 22 47.69	1.418	20 39 21.6	3.05	0.608 9118	73.4	23.16	2.17	12 16.9
23	4 22 13.57	1.424	20 38 8.1	3.08	0.608 7523	59.5	23.17	2.17	12 12.4
24	4 21 39.33	1.429	20 36 54.0	3.10	0.608 6262	45.6	23.18	2.17	12 7.9
25	4 21 4.97	1.433	20 35 39.5	3.11	0.608 5334	31.7	23.18	2.17	12 3.4
26	4 20 30.54	−1.436	+20 34 24.5	−3.13	0.608 4741	− 17.7	23.18	2.17	11 58.9
27	4 19 56.05	1.438	20 33 9.2	3.14	0.608 4483	− 3.8	23.19	2.17	11 54.4
28	4 19 21.53	1.439	20 31 53.7	3.15	0.608 4561	+ 10.2	23.19	2.17	11 49.9
29	4 18 47.00	1.438	20 30 37.9	3.16	0.608 4975	24.2	23.18	2.17	11 45.4
30	4 18 12.49	1.437	20 29 22.0	3.17	0.608 5725	38.2	23.18	2.17	11 40.9
1	4 17 38.03	−1.434	+20 28 5.9	−3.17	0.608 6810	+ 52.2	23.18	2.17	11 36.4
2	4 17 3.65	1.431	20 26 49.9	3.17	0.608 8231	66.2	23.18	2.17	11 31.9
3	4 16 29.36	1.426	20 25 33.9	3.17	0.608 9987	80.1	23.16	2.17	11 27.4
4	4 15 55.20	1.421	20 24 17.9	3.16	0.609 2077	94.0	23.15	2.16	11 22.9
5	4 15 21.18	1.414	20 23 2.2	3.15	0.609 4501	107.9	23.13	2.16	11 18.4
6	4 14 47.34	−1.406	+20 21 46.6	−3.14	0.609 7257	+121.7	23.12	2.16	11 13.9
7	4 14 13.71	1.397	20 20 31.4	3.13	0.610 0344	135.5	23.10	2.16	11 9.4
8	4 13 40.30	1.387	20 19 16.5	3.11	0.610 3761	149.2	23.08	2.16	11 4.9
9	4 13 7.14	1.376	20 18 2.2	3.09	0.610 7505	162.8	23.06	2.16	11 0.4
10	4 12 34.27	1.363	20 16 48.3	3.06	0.611 1576	176.3	23.04	2.15	10 56.0
11	4 12 1.70	−1.350	+20 15 35.1	−3.04	0.611 5969	+189.8	23.02	2.15	10 51.5
12	4 11 29.46	1.336	20 14 22.5	3.01	0.612 0684	203.1	22.99	2.15	10 47.0
13	4 10 57.58	1.320	20 13 10.6	2.98	0.612 5717	216.3	22.97	2.15	10 42.6
14	4 10 26.08	1.304	20 11 59.6	2.94	0.613 1064	229.3	22.94	2.14	10 38.1
15	4 9 54.99	1.286	20 10 49.5	2.90	0.613 6722	242.2	22.91	2.14	10 33.7
16	4 9 24.33	−1.268	+20 9 40.4	−2.86	0.614 2687	+254.9	22.88	2.14	10 29.2
17	4 8 54.12	1.249	20 8 32.3	2.82	0.614 8955	267.4	22.85	2.14	10 24.8
18	4 8 24.39	1.228	20 7 25.2	2.77	0.615 5522	279.8	22.81	2.13	10 20.4
19	4 7 55.16	1.207	20 6 19.4	2.72	0.616 2383	291.9	22.77	2.13	10 16.0
20	4 7 26.45	1.185	20 5 14.8	2.66	0.616 9533	303.8	22.74	2.13	10 11.6
21	4 6 58.28	−1.162	+20 4 11.5	−2.61	0.617 6968	+315.6	22.70	2.12	10 7.2
22	4 6 30.67	1.138	20 3 9.6	2.55	0.618 4681	327.1	22.66	2.12	10 2.8
23	4 6 3.64	1.114	20 2 9.1	2.49	0.619 2668	338.4	22.62	2.11	9 58.4
24	4 5 37.20	1.089	20 1 10.1	2.43	0.620 0924	349.5	22.57	2.11	9 54.1
25	4 5 11.37	1.063	20 0 12.6	2.36	0.620 9443	360.3	22.53	2.11	9 49.7
26	4 4 46.16	−1.037	+19 59 16.7	−2.29	0.621 8220	+371.0	22.48	2.10	9 45.4
27	4 4 21.59	1.010	19 58 22.5	2.22	0.622 7250	381.4	22.44	2.10	9 41.0
28	4 3 57.68	0.982	19 57 30.0	2.15	0.623 6526	391.6	22.39	2.09	9 36.7
29	4 3 34.44	0.954	19 56 39.3	2.08	0.624 6045	401.6	22.34	2.09	9 32.4
30	4 3 11.89	0.925	19 55 50.4	2.00	0.625 5800	411.3	22.29	2.08	9 28.1
31	4 2 50.04	−0.896	+19 55 3.4	−1.92	0.626 5786	+420.8	22.24	2.08	9 23.8
32	*4 2 28.89*	. . .	*+19 54 18.3*	. . .	0.627 6000	. . .	22.19	2.07	9 19.5

FOR GREENWICH MEAN NOON.

Date.		Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Logarithm of Radius Vector.
		° ′ ″	′ ″	″	° ′ ″	″	
Jan.	1	36 39 41.0	5 27.38	−21.8	−1 9 54.8	+3.40	0.696 5008
	5	37 1 30.4	5 27.30	22.0	1 9 41.1	3.44	0.696 5518
	9	37 23 19.4	5 27.22	22.2	1 9 27.3	3.48	0.696 6035
	13	37 45 8.1	5 27.14	22.3	1 9 13.3	3.52	0.696 6560
	17	38 6 56.5	5 27.06	22.5	1 8 59.1	3.57	0.696 7092
	21	38 28 44.6	5 26.98	−22.7	−1 8 44.7	+3.61	0.696 7631
	25	38 50 32.3	5 26.89	22.9	1 8 30.2	3.65	0.696 8178
	29	39 12 19.7	5 26.81	23.1	1 8 15.5	3.69	0.696 8731
Feb.	2	39 34 6.8	5 26.72	23.2	1 8 0.7	3.73	0.696 9292
	6	39 55 53.5	5 26.64	23.4	1 7 45.7	3.77	0.696 9860
	10	40 17 39.9	5 26.55	−23.6	−1 7 30.5	+3.81	0.697 0435
	14	40 39 25.9	5 26.46	23.7	1 7 15.2	3.84	0.697 1016
	18	41 1 11.6	5 26.38	23.9	1 6 59.8	3.88	0.697 1605
	22	41 22 56.9	5 26.29	24.0	1 6 44.2	3.93	0.697 2201
	26	41 44 41.9	5 26.20	24.2	1 6 28.4	3.97	0.697 2804
Mar.	2	42 6 26.5	5 26.10	−24.4	−1 6 12.4	+4.01	0.697 3414
	6	42 28 10.7	5 26.00	24.5	1 5 56.3	4.04	0.697 4030
	10	42 49 54.5	5 25.91	24.6	1 5 40.1	4.08	0.697 4654
	14	43 11 38.0	5 25.81	24.8	1 5 23.7	4.12	0.697 5284
	18	43 33 21.0	5 25.71	24.9	1 5 7.1	4.16	0.697 5921
	22	43 55 3.7	5 25.62	−25.0	−1 4 50.4	+4.19	0.697 6565
	26	44 16 46.0	5 25.52	25.1	1 4 33.6	4.22	0.697 7216
	30	44 38 27.9	5 25.42	25.3	1 4 16.6	4.26	0.697 7873
Apr.	3	45 0 9.4	5 25.32	25.4	1 3 59.5	4.30	0.697 8537
	7	45 21 50.5	5 25.22	25.5	1 3 42.2	4.35	0.697 9208
	11	45 43 31.2	5 25.11	−25.6	−1 3 24.7	+4.39	0.697 9885
	15	46 5 11.4	5 25.01	25.7	1 3 7.1	4.41	0.698 0568
	19	46 26 51.3	5 24.91	25.8	1 2 49.4	4.45	0.698 1259
	23	46 48 30.7	5 24.81	25.9	1 2 31.5	4.49	0.698 1955
	27	47 10 9.8	5 24.70	26.0	1 2 13.5	4.52	0.698 2659
May	1	47 31 48.3	5 24.59	−26.0	−1 1 55.3	+4.56	0.698 3369
	5	47 53 26.5	5 24.49	26.1	1 1 37.0	4.59	0.698 4085
	9	48 15 4.2	5 24.38	26.2	1 1 18.6	4.62	0.698 4807
	13	48 36 41.5	5 24.28	26.3	1 1 0.0	4.66	0.698 5536
	17	48 58 18.4	5 24.16	26.4	1 0 41.3	4.70	0.698 6271
	21	49 19 54.8	5 24.04	−26.4	−1 0 22.4	+4.74	0.698 7013
	25	49 41 30.7	5 23.93	26.5	1 0 3.4	4.76	0.698 7761
	29	50 3 6.2	5 23.82	26.5	0 59 44.3	4.80	0.698 8515
June	2	50 24 41.3	5 23.71	26.6	0 59 25.0	4.84	0.698 9275
	6	50 46 15.9	5 23.59	26.6	0 59 5.6	4.86	0.699 0041
	10	51 7 50.0	5 23.46	−26.7	−0 58 46.1	+4.89	0.699 0813
	14	51 29 23.6	5 23.35	26.7	0 58 26.5	4.92	0.699 1592
	18	51 50 56.8	5 23.24	26.8	0 58 6.7	4.96	0.699 2376
	22	52 12 29.5	5 23.12	26.8	0 57 46.8	5.00	0.699 3166
	26	52 34 1.8	5 23.00	26.8	0 57 26.7	5.04	0.699 3963
	30	52 55 33.5	5 22.88	−26.8	−0 57 6.5	+5.06	0.699 4765
July	4	53 17 4.8	5 22.76	−26.8	−0 56 46.2	+5.09	0.699 5573

FOR GREENWICH MEAN NOON.

ate.	Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
	° ′ ″	′ ″	″	° ′ ″	″		
4	53 17 4.8	5 22.76	−26.8	−0 56 46.2	+5.09	0.699 5573	+202.7
8	53 38 35.6	5 22.64	26.8	0 56 25.8	5.12	0.699 6387	204.2
12	54 0 5.9	5 22.51	26.8	0 56 5.2	5.16	0.699 7207	205.6
16	54 21 35.7	5 22.39	26.9	0 55 44.5	5.19	0.699 8032	207.0
20	54 43 5.0	5 22.26	26.9	0 55 23.7	5.21	0.699 8863	208.5
24	55 4 33.8	5 22.14	−26.9	−0 55 2.8	+5.24	0.699 9700	+210.0
28	55 26 2.1	5 22.01	26.8	0 54 41.8	5.27	0.700 0543	211.5
1	55 47 29.9	5 21.89	26.8	0 54 20.6	5.30	0.700 1392	212.9
5	56 8 57.2	5 21.76	26.8	0 53 59.4	5.33	0.700 2246	214.1
9	56 30 24.0	5 21.64	26.8	0 53 38.0	5.37	0.700 3105	215.5
13	56 51 50.3	5 21.50	−26.8	−0 53 16.4	+5.40	0.700 3970	+217.0
17	57 13 16.0	5 21.36	26.8	0 52 54.8	5.42	0.700 4841	218.4
21	57 34 41.2	5 21.24	26.7	0 52 33.1	5.45	0.700 5717	219.7
25	57 56 6.0	5 21.11	26.7	0 52 11.2	5.48	0.700 6599	221.0
29	58 17 30.1	5 20.98	26.6	0 51 49.2	5.50	0.700 7485	222.4
2	58 38 53.8	5 20.85	−26.6	−0 51 27.2	+5.53	0.700 8378	+223.7
6	59 0 16.9	5 20.71	26.6	0 51 5.0	5.56	0.700 9275	225.0
10	59 21 39.5	5 20.58	26.5	0 50 42.7	5.59	0.701 0178	226.4
14	59 43 1.5	5 20.45	26.4	0 50 20.3	5.62	0.701 1086	227.6
18	60 4 23.1	5 20.31	26.4	0 49 57.7	5.65	0.701 1999	228.9
22	60 25 44.0	5 20.17	−26.3	−0 49 35.1	+5.67	0.701 2917	+230.1
26	60 47 4.4	5 20.04	26.2	0 49 12.4	5.70	0.701 3840	231.5
30	61 8 24.3	5 19.90	26.2	0 48 49.5	5.72	0.701 4769	232.7
4	61 29 43.6	5 19.76	26.1	0 48 26.6	5.75	0.701 5702	233.9
8	61 51 2.4	5 19.62	26.0	0 48 3.5	5.77	0.701 6640	235.0
12	62 12 20.6	5 19.48	−25.9	−0 47 40.4	+5.79	0.701 7582	+236.2
16	62 33 38.2	5 19.34	25.8	0 47 17.2	5.81	0.701 8530	237.6
20	62 54 55.3	5 19.20	25.8	0 46 53.9	5.85	0.701 9483	238.8
24	63 16 11.8	5 19.06	25.7	0 46 30.4	5.87	0.702 0440	239.9
28	63 37 27.8	5 18.92	25.6	0 46 6.9	5.89	0.702 1402	241.0
1	63 58 43.2	5 18.78	−25.4	−0 45 43.3	+5.92	0.702 2368	+242.2
5	64 19 58.0	5 18.63	25.3	0 45 19.5	5.94	0.702 3340	243.4
9	64 41 12.2	5 18.49	25.2	0 44 55.7	5.96	0.702 4315	244.5
13	65 2 25.9	5 18.35	25.1	0 44 31.8	5.99	0.702 5296	245.7
17	65 23 39.0	5 18.20	25.0	0 44 7.8	6.01	0.702 6281	246.8
21	65 44 51.5	5 18.05	−24.9	−0 43 43.7	+6.03	0.702 7270	+247.9
25	66 6 3.4	5 17.90	24.7	0 43 19.6	6.05	0.702 8264	249.0
29	66 27 14.7	5 17.76	24.6	0 42 55.3	6.07	0.702 9262	250.1
3	66 48 25.5	5 17.61	24.5	0 42 31.0	6.09	0.703 0265	251.2
7	67 9 35.6	5 17.46	24.3	0 42 6.6	6.12	0.703 1272	252.3
11	67 30 45.2	5 17.32	−24.2	−0 41 42.0	+6.15	0.703 2283	+253.3
15	67 51 54.2	5 17.17	24.0	0 41 17.4	6.17	0.703 3298	254.3
19	68 13 2.6	5 17.01	23.9	0 40 52.7	6.19	0.703 4317	255.4
23	68 34 10.3	5 16.86	23.7	0 40 27.9	6.20	0.703 5341	256.5
27	68 55 17.5	5 16.72	23.6	0 40 3.1	6.22	0.703 6369	257.4
31	69 16 24.1	5 16.56	−23.4	−0 39 38.2	+6.24	0.703 7400	+258.4
35	69 37 30.0	5 16.41	−23.3	−0 39 13.2	+6.26	0.703 8438	+259.5

GREENWICH MEAN TIME.

Date.		Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Polar Semi-diameter.	Hor. Parallax.	[illegible]
		Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	
		h m s	s	° ′ ″	″			″	″	h
Jan.	1	8 2 25.24	−0.792	+20 38 59.3	+2.59	0.909 5168	−112.3	9.54	1.09	13
	2	8 2 6.13	0.800	20 40 1.7	2.61	0.909 2552	105.6	9.55	1.09	13
	3	8 1 46.84	0.808	20 41 4.5	2.62	0.909 0098	98.9	9.55	1.09	13
	4	8 1 27.37	0.814	20 42 7.6	2.64	0.908 7806	92.1	9.56	1.09	13
	5	8 1 7.75	0.821	20 43 11.0	2.65	0.908 5677	85.3	9.56	1.09	13
	6	8 0 47.98	−0.827	+20 44 14.6	+2.66	0.908 3713	− 78.4	9.57	1.09	12
	7	8 0 28.06	0.833	20 45 18.5	2.67	0.908 1915	71.5	9.57	1.09	12
	8	8 0 8.02	0.837	20 46 22.6	2.67	0.908 0283	64.5	9.57	1.09	12
	9	7 59 47.87	0.842	20 47 26.8	2.68	0.907 8819	57.5	9.58	1.09	12
	10	7 59 27.61	0.846	20 48 31.1	2.68	0.907 7521	50.6	9.58	1.09	12
	11	7 59 7.26	−0.850	+20 49 35.5	+2.69	0.907 6392	− 43.5	9.58	1.09	12
	12	7 58 46.82	0.853	20 50 40.0	2.69	0.907 5431	36.5	9.58	1.09	12
	13	7 58 26.31	0.856	20 51 44.5	2.69	0.907 4640	29.4	9.59	1.09	12
	14	7 58 5.74	0.858	20 52 49.0	2.69	0.907 4018	22.4	9.59	1.09	12
	15	7 57 45.12	0.860	20 53 53.4	2.68	0.907 3566	15.2	9.59	1.09	12
	16	7 57 24.47	−0.861	+20 54 57.7	+2.68	0.907 3286	− 8.1	9.59	1.09	12
	17	7 57 3.80	0.862	20 56 1.9	2.67	0.907 3178	− 0.9	9.59	1.09	12
	18	7 56 43.11	0.862	20 57 5.9	2.67	0.907 3242	+ 6.3	9.59	1.09	12
	19	7 56 22.43	0.862	20 58 9.7	2.65	0.907 3479	13.5	9.59	1.09	12
	20	7 56 1.75	0.861	20 59 13.3	2.64	0.907 3888	20.6	9.59	1.09	11
	21	7 55 41.11	−0.859	+21 0 16.7	+2.63	0.907 4468	+ 27.7	9.59	1.09	11
	22	7 55 20.50	0.858	21 1 19.7	2.62	0.907 5219	34.8	9.58	1.09	11
	23	7 54 59.94	0.856	21 2 22.4	2.61	0.907 6141	42.0	9.58	1.09	11
	24	7 54 39.44	0.853	21 3 24.8	2.59	0.907 7234	49.1	9.58	1.09	11
	25	7 54 19.02	0.849	21 4 26.7	2.57	0.907 8496	56.1	9.58	1.09	11
	26	7 53 58.69	−0.845	+21 5 28.2	+2.55	0.907 9928	+ 63.2	9.57	1.09	11 31
	27	7 53 38.46	0.840	21 6 29.2	2.53	0.908 1528	70.2	9.57	1.09	11 26
	28	7 53 18.35	0.836	21 7 29.7	2.51	0.908 3296	77.1	9.57	1.09	11 22
	29	7 52 58.36	0.830	21 8 29.6	2.48	0.908 5229	84.0	9.56	1.09	11 18
	30	7 52 38.51	0.824	21 9 28.9	2.46	0.908 7328	90.9	9.56	1.09	11 14
	31	7 52 18.81	−0.818	+21 10 27.7	+2.44	0.908 9590	+ 97.6	9.55	1.09	11 9
Feb.	1	7 51 59.26	0.811	21 11 25.9	2.41	0.909 2014	104.3	9.55	1.08	11 5
	2	7 51 39.89	0.803	21 12 23.4	2.38	0.909 4598	111.0	9.54	1.08	11 1
	3	7 51 20.70	0.796	21 13 20.3	2.36	0.909 7340	117.5	9.54	1.08	10 57
	4	7 51 1.70	0.788	21 14 16.5	2.33	0.910 0240	124.1	9.53	1.08	10 52
	5	7 50 42.90	−0.779	+21 15 12.0	+2.30	0.910 3296	+130.6	9.52	1.08	10 48
	6	7 50 24.31	0.770	21 16 6.7	2.26	0.910 6507	137.0	9.52	1.08	10 44
	7	7 50 5.94	0.760	21 17 0.7	2.23	0.910 9872	143.3	9.51	1.08	10 40
	8	7 49 47.81	0.750	21 17 53.8	2.20	0.911 3387	149.6	9.50	1.08	10 35
	9	7 49 29.92	0.740	21 18 46.2	2.17	0.911 7053	155.8	9.49	1.08	10 31
	10	7 49 12.27	−0.730	+21 19 37.8	+2.13	0.912 0866	+161.9	9.48	1.08	10 27
	11	7 48 54.89	0.719	21 20 28.6	2.10	0.912 4825	167.9	9.48	1.08	10 23
	12	7 48 37.77	0.707	21 21 18.5	2.06	0.912 8927	173.9	9.47	1.08	10 19
	13	7 48 20.94	0.695	21 22 7.5	2.02	0.913 3172	179.8	9.46	1.07	10 14
	14	7 48 4.39	0.683	21 22 55.7	1.99	0.913 7557	185.6	9.45	1.07	10 10
	15	7 47 48.14	−0.671	+21 23 42.9	+1.95	0.914 2081	+191.3	9.44	1.07	10 6
	16	7 47 32.20	−0.658	+21 24 29.2	+1.91	0.914 6740	+196.9	9.43	1.07	10 2

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension. Noon.	Var. per Hour. Noon.	Apparent Declination. Noon.	Var. per Hour. Noon.	Logarithm of Distance from Earth. Noon.	Var. per Hour. Noon.	Polar Semi-diameter. Noon.	Hor. Parallax. Noon.	Transit, Meridian of Greenwich.
	h m s	s	° ′ ″	″			″	″	h m
16	7 47 32.20	−0.658	+21 24 29.2	+1.91	0.914 6740	+196.9	9.43	1.07	10 2.2
17	7 47 16.57	0.644	21 25 14.6	1.87	0.915 1534	202.5	9.42	1.07	9 58.0
18	7 47 1.27	0.631	21 25 59.0	1.83	0.915 6459	207.9	9.41	1.07	9 53.8
19	7 46 46.30	0.617	21 26 42.4	1.79	0.916 1514	213.3	9.40	1.07	9 49.6
20	7 46 31.68	0.602	21 27 24.8	1.75	0.916 6697	218.5	9.38	1.07	9 45.4
21	7 46 17.40	−0.588	+21 28 6.2	+1.70	0.917 2004	+223.7	9.37	1.06	9 41.3
22	7 46 3.48	0.572	21 28 46.6	1.66	0.917 7433	228.7	9.36	1.06	9 37.1
23	7 45 49.93	0.557	21 29 26.0	1.62	0.918 2981	233.6	9.35	1.06	9 33.0
24	7 45 36.75	0.541	21 30 4.3	1.57	0.918 8646	238.4	9.34	1.06	9 28.8
25	7 45 23.95	0.525	21 30 41.5	1.53	0.919 4425	243.1	9.32	1.06	9 24.7
26	7 45 11.54	−0.509	+21 31 17.7	+1.48	0.920 0315	+247.6	9.31	1.06	9 20.5
27	7 44 59.52	0.492	21 31 52.7	1.44	0.920 6312	252.1	9.30	1.06	9 16.4
28	7 44 47.91	0.476	21 32 26.7	1.39	0.921 2415	256.4	9.29	1.05	9 12.3
r. 1	7 44 36.69	0.459	21 32 59.5	1.34	0.921 8619	260.6	9.27	1.05	9 8.2
2	7 44 25.88	0.442	21 33 31.2	1.30	0.922 4923	264.7	9.26	1.05	9 4.1
3	7 44 15.49	−0.424	+21 34 1.8	+1.25	0.923 1324	+268.7	9.25	1.05	9 0.0
4	7 44 5.51	0.407	21 34 31.3	1.21	0.923 7820	272.5	9.23	1.05	8 55.9
5	7 43 55.96	0.389	21 34 59.7	1.16	0.924 4406	276.3	9.22	1.05	8 51.8
6	7 43 46.84	0.371	21 35 27.0	1.11	0.925 1081	279.9	9.20	1.05	8 47.7
7	7 43 38.15	0.353	21 35 53.1	1.06	0.925 7841	283.4	9.19	1.04	8 43.6
8	7 43 29.89	−0.335	+21 36 18.1	+1.02	0.926 4683	+286.8	9.18	1.04	8 39.6
9	7 43 22.07	0.317	21 36 42.0	0.97	0.927 1605	290.0	9.16	1.04	8 35.5
10	7 43 14.69	0.298	21 37 4.8	0.92	0.927 8605	293.2	9.15	1.04	8 31.4
11	7 43 7.75	0.280	21 37 26.4	0.88	0.928 5680	296.3	9.13	1.04	8 27.4
12	7 43 1.26	0.261	21 37 46.8	0.83	0.929 2826	299.2	9.12	1.04	8 23.4
13	7 42 55.22	−0.242	+21 38 6.1	+0.78	0.930 0043	+302.1	9.10	1.03	8 19.3
14	7 42 49.64	0.223	21 38 24.3	0.73	0.930 7326	304.8	9.09	1.03	8 15.3
15	7 42 44.51	0.204	21 38 41.3	0.68	0.931 4673	307.4	9.07	1.03	8 11.3
16	7 42 39.83	0.185	21 38 57.1	0.64	0.932 2081	309.9	9.05	1.03	8 7.3
17	7 42 35.62	0.166	21 39 11.8	0.59	0.932 9549	312.3	9.04	1.03	8 3.3
18	7 42 31.87	−0.147	+21 39 25.3	+0.54	0.933 7072	+314.6	9.02	1.03	7 59.3
19	7 42 28.58	0.128	21 39 37.6	0.49	0.934 4649	316.8	9.01	1.02	7 55.3
20	7 42 25.76	0.108	21 39 48.8	0.44	0.935 2276	318.8	8.99	1.02	7 51.4
21	7 42 23.41	0.088	21 39 58.8	0.39	0.935 9951	320.7	8.98	1.02	7 47.4
22	7 42 21.53	0.068	21 40 7.6	0.34	0.936 7671	322.5	8.96	1.02	7 43.4
23	7 42 20.13	−0.049	+21 40 15.2	+0.29	0.937 5433	+324.2	8.94	1.02	7 39.5
24	7 42 19.19	0.029	21 40 21.7	0.24	0.938 3234	325.8	8.93	1.01	7 35.5
25	7 42 18.73	−0.010	21 40 26.9	0.19	0.939 1071	327.2	8.91	1.01	7 31.6
26	7 42 18.74	+0.010	21 40 31.0	0.15	0.939 8941	328.6	8.90	1.01	7 27.6
27	7 42 19.22	0.030	21 40 33.9	0.10	0.940 6842	329.8	8.88	1.01	7 23.7
28	7 42 20.18	+0.049	+21 40 35.6	+0.05	0.941 4770	+330.8	8.86	1.01	7 19.8
29	7 42 21.60	0.069	21 40 36.1	0.00	0.942 2723	331.8	8.85	1.01	7 15.9
30	7 42 23.50	0.089	21 40 35.5	−0.05	0.943 0697	332.7	8.83	1.00	7 12.0
31	7 42 25.87	0.109	21 40 33.7	0.10	0.943 8691	333.4	8.82	1.00	7 8.1
r. 1	7 42 28.70	0.128	21 40 30.7	0.15	0.944 6702	334.1	8.80	1.00	7 4.3
2	7 42 32.00	+0.147	+21 40 26.6	−0.20	0.945 4727	+334.6	8.78	1.00	7 0.4
3	*7 42 35.77*	*+0.167*	*+21 40 21.3*	*−0.24*	0.946 2764	+335.1	8.77	1.00	6 56.5

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Polar Semi-diameter.	Hor Paralax.
	Noon.	*Noon.*	*Noon.*	*Noon.*	*Noon.*	*Noon.*	*Noon.*	*Noo*
	h m s	s	° ′ ″	″			″	″
Apr. 1	7 42 28.70	+0.128	+21 40 30.7	−0.15	0.944 6702	+334.1	8.80	1.0
2	7 42 32.00	0.147	21 40 26.6	0.20	0.945 4727	334.6	8.78	1.0
3	7 42 35.77	0.167	21 40 21.3	0.24	0.946 2764	335.1	8.77	1.0
4	7 42 40.00	0.186	21 40 14.9	0.29	0.947 0811	335.4	8.75	0.9
5	7 42 44.69	0.205	21 40 7.3	0.34	0.947 8866	335.7	8.73	0.9
6	7 42 49.84	+0.224	+21 39 58.5	−0.39	0.948 6925	+335.8	8.72	0.9
7	7 42 55.44	0.243	21 39 48.6	0.44	0.949 4987	335.9	8.70	0.9
8	7 43 1.50	0.262	21 39 37.6	0.48	0.950 3050	335.9	8.68	0.9
9	7 43 8.01	0.281	21 39 25.4	0.53	0.951 1111	335.8	8.67	0.9
10	7 43 14.97	0.299	21 39 12.1	0.58	0.951 9169	335.6	8.65	0.9
11	7 43 22.38	+0.318	+21 38 57.6	−0.62	0.952 7221	+335.4	8.64	0.9
12	7 43 30.23	0.337	21 38 42.1	0.67	0.953 5266	335.0	8.62	0.9
13	7 43 38.53	0.355	21 38 25.4	0.72	0.954 3301	334.6	8.60	0.9
14	7 43 47.28	0.374	21 38 7.6	0.76	0.955 1325	334.0	8.59	0.9
15	7 43 56.46	0.392	21 37 48.7	0.81	0.955 9334	333.4	8.57	0.9
16	7 44 6.09	+0.410	+21 37 28.6	−0.86	0.956 7328	+332.7	8.56	0.9
17	7 44 16.15	0.428	21 37 7.4	0.91	0.957 5303	331.9	8.54	0.9
18	7 44 26.64	0.446	21 36 45.0	0.96	0.958 3257	331.0	8.53	0.9
19	7 44 37.56	0.464	21 36 21.5	1.00	0.959 1189	330.0	8.51	0.9
20	7 44 48.91	0.482	21 35 56.9	1.05	0.959 9096	328.9	8.49	0.9
21	7 45 0.68	+0.499	+21 35 31.1	−1.10	0.960 6977	+327.8	8.48	0.9
22	7 45 12.88	0.517	21 35 4.3	1.14	0.961 4829	326.5	8.47	0.9
23	7 45 25.49	0.534	21 34 36.3	1.19	0.962 2649	325.2	8.45	0.9
24	7 45 38.52	0.551	21 34 7.2	1.23	0.963 0437	323.8	8.43	0.9
25	7 45 51.96	0.568	21 33 37.1	1.28	0.963 8190	322.3	8.42	0.9
26	7 46 5.80	+0.585	+21 33 5.8	−1.33	0.964 5906	+320.7	8.40	0.9
27	7 46 20.04	0.602	21 32 33.4	1.37	0.965 3583	319.0	8.39	0.9
28	7 46 34.68	0.618	21 31 59.9	1.42	0.966 1220	317.4	8.37	0.9
29	7 46 49.72	0.635	21 31 25.3	1.46	0.966 8816	315.6	8.36	0.9
30	7 47 5.14	0.650	21 30 49.7	1.51	0.967 6368	313.7	8.35	0.9
May 1	7 47 20.94	+0.667	+21 30 13.0	−1.55	0.968 3875	+311.8	8.33	0.9
2	7 47 37.13	0.682	21 29 35.2	1.60	0.969 1335	309.8	8.32	0.9
3	7 47 53.69	0.698	21 28 56.4	1.64	0.969 8747	307.8	8.30	0.9
4	7 48 10.62	0.713	21 28 16.5	1.68	0.970 6109	305.7	8.29	0.9
5	7 48 27.91	0.728	21 27 35.6	1.73	0.971 3421	303.6	8.27	0.9
6	7 48 45.57	+0.743	+21 26 53.6	−1.77	0.972 0681	+301.4	8.26	0.9
7	7 49 3.59	0.758	21 26 10.6	1.81	0.972 7888	299.1	8.25	0.9
8	7 49 21.96	0.773	21 25 26.5	1.86	0.973 5039	296.8	8.23	0.9
9	7 49 40.67	0.787	21 24 41.4	1.90	0.974 2134	294.4	8.22	0.9
10	7 49 59.74	0.802	21 23 55.3	1.94	0.974 9172	292.0	8.21	0.9
11	7 50 19.14	+0.816	+21 23 8.1	−1.99	0.975 6151	+289.6	8.19	0.9
12	7 50 38.89	0.830	21 22 19.9	2.03	0.976 3071	287.0	8.18	0.9
13	7 50 58.96	0.843	21 21 30.6	2.07	0.976 9929	284.5	8.17	0.9
14	7 51 19.37	0.857	21 20 40.3	2.12	0.977 6726	281.9	8.16	0.9
15	7 51 40.10	0.871	21 19 49.0	2.16	0.978 3459	279.2	8.14	0.9
16	7 52 1.16	+0.884	+21 18 56.7	−2.20	0.979 0128	+276.5	8.13	0.9
17	7 52 22.53	+0.897	+21 18 3.4	−2.24	0.979 6730	+273.7	8.12	0.9

G MEAN TIME.

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension. Noon.	Var. per Hour. Noon.	Apparent Declination. Noon.	Var. per Hour. Noon.	Logarithm of Distance from Earth. Noon.	Var. per Hour. Noon.	Polar Semi-diameter. Noon.	Hor. Parallax. Noon.	Transit, Meridian of Greenwich.
	h m s	s	° ′ ″	″			″	″	h m
16	8 36 54.10	+1.293	+19 3 19.5	−4.51	1.002 6935	− 82.6	7.70	0.87	22 56.4
17	8 37 25.07	1.289	19 1 31.3	4.51	1.002 4900	86.9	7.70	0.87	22 53.0
18	8 37 55.95	1.284	18 59 43.1	4.51	1.002 2762	91.2	7.71	0.87	22 49.6
19	8 38 26.72	1.280	18 57 55.0	4.50	1.002 0523	95.4	7.71	0.87	22 46.1
20	8 38 57.38	1.275	18 56 7.0	4.50	1.001 8183	99.6	7.71	0.88	22 42.7
21	8 39 27.93	+1.270	+18 54 19.1	−4.49	1.001 5742	−103.8	7.72	0.88	22 39.3
22	8 39 58.36	1.265	18 52 31.4	4.49	1.001 3202	107.9	7.72	0.88	22 35.8
23	8 40 28.67	1.260	18 50 43.8	4.48	1.001 0562	112.1	7.73	0.88	22 32.4
24	8 40 58.86	1.255	18 48 56.4	4.47	1.000 7823	116.2	7.73	0.88	22 29.0
25	8 41 28.91	1.249	18 47 9.2	4.46	1.000 4985	120.3	7.74	0.88	22 25.5
26	8 41 58.82	+1.243	+18 45 22.3	−4.45	1.000 2048	−124.4	7.74	0.88	22 22.1
27	8 42 28.59	1.238	18 43 35.6	4.44	0.999 9013	128.5	7.75	0.88	22 18.6
28	8 42 58.22	1.231	18 41 49.1	4.43	0.999 5881	132.5	7.75	0.88	22 15.2
29	8 43 27.70	1.225	18 40 3.0	4.41	0.999 2651	136.6	7.76	0.88	22 11.8
30	8 43 57.03	1.219	18 38 17.2	4.40	0.998 9325	140.6	7.76	0.88	22 8.3
31	8 44 26.21	+1.212	+18 36 31.7	−4.39	0.998 5903	−144.6	7.77	0.88	22 4.9
pt. 1	8 44 55.22	1.205	18 34 46.6	4.37	0.998 2386	148.6	7.78	0.88	22 1.4
2	8 45 24.07	1.199	18 33 1.8	4.36	0.997 8772	152.6	7.78	0.88	21 58.0
3	8 45 52.76	1.192	18 31 17.4	4.34	0.997 5063	156.5	7.79	0.88	21 54.5
4	8 46 21.27	1.184	18 29 33.5	4.32	0.997 1259	160.5	7.80	0.88	21 51.0
5	8 46 49.61	+1.177	+18 27 50.0	−4.30	0.996 7360	−164.4	7.80	0.89	21 47.6
6	8 47 17.77	1.170	18 26 6.9	4.29	0.996 3368	168.3	7.81	0.89	21 44.1
7	8 47 45.75	1.162	18 24 24.3	4.26	0.995 9282	172.2	7.82	0.89	21 40.6
8	8 48 13.53	1.154	18 22 42.2	4.24	0.995 5102	176.1	7.83	0.89	21 37.2
9	8 48 41.13	1.146	18 21 0.6	4.22	0.995 0829	180.0	7.83	0.89	21 33.7
10	8 49 8.52	+1.137	+18 19 19.6	−4.20	0.994 6464	−183.8	7.84	0.89	21 30.2
11	8 49 35.72	1.129	18 17 39.2	4.17	0.994 2007	187.6	7.85	0.89	21 26.7
12	8 50 2.71	1.120	18 15 59.3	4.15	0.993 7459	191.4	7.86	0.89	21 23.2
13	8 50 29.49	1.111	18 14 20.2	4.12	0.993 2820	195.2	7.87	0.89	21 19.8
14	8 50 56.05	1.102	18 12 41.7	4.09	0.992 8091	198.9	7.87	0.90	21 16.3
15	8 51 22.39	+1.093	+18 11 3.9	−4.06	0.992 3272	−202.6	7.88	0.90	21 12.8
16	8 51 48.50	1.083	18 9 26.8	4.03	0.991 8364	206.3	7.89	0.90	21 9.3
17	8 52 14.39	1.074	18 7 50.4	4.00	0.991 3368	210.0	7.90	0.90	21 5.8
18	8 52 40.03	1.064	18 6 14.8	3.97	0.990 8284	213.6	7.91	0.90	21 2.2
19	8 53 5.44	1.054	18 4 40.0	3.94	0.990 3113	217.2	7.92	0.90	20 58.7
20	8 53 30.61	+1.044	+18 3 5.9	−3.90	0.989 7857	−220.8	7.93	0.90	20 55.2
21	8 53 55.53	1.033	18 1 32.8	3.86	0.989 2517	224.3	7.94	0.90	20 51.7
22	8 54 20.19	1.022	18 0 0.5	3.83	0.988 7093	227.7	7.95	0.90	20 48.2
23	8 54 44.59	1.011	17 58 29.1	3.79	0.988 1587	231.1	7.96	0.90	20 44.6
24	8 55 8.73	1.000	17 56 58.6	3.75	0.987 5999	234.5	7.97	0.91	20 41.1
25	8 55 32.61	+0.989	+17 55 29.0	−3.71	0.987 0331	−237.8	7.98	0.91	20 37.6
26	8 55 56.22	0.978	17 54 0.4	3.67	0.986 4583	241.1	7.99	0.91	20 34.0
27	8 56 19.56	0.967	17 52 32.7	3.63	0.985 8757	244.4	8.00	0.91	20 30.5
28	8 56 42.62	0.955	17 51 6.0	3.59	0.985 2853	247.6	8.01	0.91	20 26.9
29	8 57 5.40	0.943	17 49 40.4	3.54	0.984 6872	250.8	8.02	0.91	20 23.4
30	8 57 27.89	+0.931	+17 48 15.9	−3.50	0.984 0816	−253.9	8.04	0.91	20 19.8
t. 1	8 57 50.09	+0.919	+17 46 52.4	−3.46	0.983 4685	−257.0	8.05	0.91	20 16.2

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Polar Semi-diameter.	Hor. Parallax.
	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.
	h m s	s	° ′ ″	″			″	″
Oct. 1	8 57 50.09	+0.919	+17 46 52.4	−3.46	0.983 4685	−257.0	8.05	0.91
2	8 58 12.01	0.907	17 45 29.9	3.41	0.982 8479	260.1	8.06	0.92
3	8 58 33.62	0.894	17 44 8.6	3.36	0.982 2201	263.1	8.07	0.92
4	8 58 54.94	0.882	17 42 48.5	3.32	0.981 5851	266.1	8.08	0.92
5	8 59 15.95	0.869	17 41 29.5	3.27	0.980 9430	269.0	8.09	0.92
6	8 59 36.66	+0.856	+17 40 11.7	−3.22	0.980 2938	−271.9	8.11	0.92
7	8 59 57.05	0.843	17 38 55.1	3.17	0.979 6378	274.8	8.12	0.92
8	9 0 17.13	0.830	17 37 39.7	3.11	0.978 9750	277.6	8.13	0.92
9	9 0 36.88	0.816	17 36 25.6	3.06	0.978 3055	280.3	8.14	0.93
10	9 0 56.31	0.802	17 35 12.8	3.01	0.977 6294	283.0	8.16	0.93
11	9 1 15.40	+0.788	+17 34 1.3	−2.95	0.976 9469	−285.7	8.17	0.93
12	9 1 34.15	0.774	17 32 51.2	2.89	0.976 2581	288.3	8.18	0.93
13	9 1 52.57	0.760	17 31 42.4	2.84	0.975 5632	290.8	8.19	0.93
14	9 2 10.64	0.746	17 30 35.0	2.78	0.974 8624	293.2	8.21	0.93
15	9 2 28.36	0.731	17 29 29.0	2.72	0.974 1557	295.6	8.22	0.93
16	9 2 45.72	+0.716	+17 28 24.5	−2.66	0.973 4433	−298.0	8.23	0.94
17	9 3 2.73	0.701	17 27 21.5	2.59	0.972 7254	300.3	8.25	0.94
18	9 3 19.38	0.686	17 26 20.0	2.53	0.972 0021	302.5	8.26	0.94
19	9 3 35.67	0.671	17 25 20.0	2.47	0.971 2735	304.6	8.28	0.94
20	9 3 51.58	0.655	17 24 21.6	2.40	0.970 5400	306.6	8.29	0.94
21	9 4 7.12	+0.640	+17 23 24.7	−2.34	0.969 8017	−308.6	8.30	0.94
22	9 4 22.28	0.624	17 22 29.4	2.27	0.969 0587	310.5	8.32	0.94
23	9 4 37.07	0.608	17 21 35.6	2.21	0.968 3113	312.3	8.33	0.95
24	9 4 51.47	0.592	17 20 43.5	2.14	0.967 5595	314.1	8.35	0.95
25	9 5 5.49	0.576	17 19 53.0	2.07	0.966 8036	315.8	8.36	0.95
26	9 5 19.12	+0.560	+17 19 4.2	−2.00	0.966 0438	−317.4	8.38	0.95
27	9 5 32.36	0.543	17 18 17.0	1.93	0.965 2802	318.9	8.39	0.95
28	9 5 45.20	0.527	17 17 31.5	1.86	0.964 5131	320.3	8.40	0.95
29	9 5 57.65	0.510	17 16 47.7	1.79	0.963 7426	321.7	8.42	0.96
30	9 6 9.70	0.494	17 16 5.6	1.72	0.962 9689	323.0	8.44	0.96
31	9 6 21.34	+0.476	+17 15 25.3	−1.64	0.962 1921	−324.3	8.45	0.96
Nov. 1	9 6 32.57	0.460	17 14 46.7	1.57	0.961 4125	325.4	8.47	0.96
2	9 6 43.40	0.443	17 14 9.9	1.50	0.960 6301	326.5	8.48	0.96
3	9 6 53.82	0.425	17 13 34.8	1.42	0.959 8453	327.5	8.50	0.97
4	9 7 3.82	0.408	17 13 1.6	1.35	0.959 0581	328.4	8.51	0.97
5	9 7 13.40	+0.390	+17 12 30.2	−1.27	0.958 2689	−329.3	8.53	0.97
6	9 7 22.56	0.373	17 12 0.6	1.19	0.957 4777	330.0	8.54	0.97
7	9 7 31.29	0.355	17 11 32.9	1.11	0.956 6848	330.7	8.56	0.97
8	9 7 39.60	0.337	17 11 7.1	1.04	0.955 8905	331.2	8.57	0.97
9	9 7 47.47	0.319	17 10 43.2	0.96	0.955 0949	331.7	8.59	0.98
10	9 7 54.91	+0.301	+17 10 21.2	−0.88	0.954 2984	−332.0	8.61	0.98
11	9 8 1.91	0.283	17 10 1.1	0.80	0.953 5012	332.3	8.62	0.98
12	9 8 8.48	0.265	17 9 42.9	0.72	0.952 7034	332.5	8.64	0.98
13	9 8 14.61	0.246	17 9 26.7	0.63	0.951 9053	332.6	8.65	0.98
14	9 8 20.29	0.228	17 9 12.5	0.55	0.951 1072	332.5	8.67	0.98
15	9 8 25.53	+0.209	+17 9 0.2	−0.47	0.950 3093	−332.4	8.68	0.99
16	9 8 30.33	+0.191	+17 8 49.8	−0.39	0.949 5119	−332.1	8.70	0.99

GREENWICH MEAN TIME.

	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Logarithm of Distance from Earth.	Var. per Hour.	Polar Semi-diameter.	Hor. Parallax.	Transit, Meridian of Greenwich.
	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ′ ″	″			″	″	h m
.16	9 8 30.33	+0.191	+17 8 49.8	−0.39	0.949 5119	−332.1	8.70	0.99	17 25.7
17	9 8 34.68	0.172	17 8 41.4	0.31	0.948 7153	331.7	8.72	0.99	17 21.9
18	9 8 38.58	0.153	17 8 35.0	0.23	0.947 9199	331.1	8.73	0.99	17 18.0
19	9 8 42.02	0.134	17 8 30.6	0.14	0.947 1259	330.5	8.75	0.99	17 14.1
20	9 8 45.02	0.116	17 8 28.1	−0.06	0.946 3334	329.8	8.76	1.00	17 10.2
21	9 8 47.57	+0.097	+17 8 27.7	+0.02	0.945 5428	−329.0	8.78	1.00	17 6.3
22	9 8 49.67	0.078	17 8 29.2	0.11	0.944 7543	328.1	8.80	1.00	17 2.4
23	9 8 51.32	0.059	17 8 32.8	0.19	0.943 9681	327.0	8.81	1.00	16 58.5
24	9 8 52.52	0.041	17 8 38.3	0.27	0.943 1846	325.9	8.83	1.00	16 54.6
25	9 8 53.27	0.022	17 8 45.8	0.35	0.942 4040	324.6	8.84	1.00	16 50.7
26	9 8 53.57	+0.003	+17 8 55.3	+0.44	0.941 6266	−323.2	8.86	1.01	16 46.8
27	9 8 53.42	−0.015	17 9 6.7	0.52	0.940 8526	321.7	8.88	1.01	16 42.8
28	9 8 52.82	0.034	17 9 20.1	0.60	0.940 0823	320.2	8.89	1.01	16 38.9
29	9 8 51.77	0.053	17 9 35.4	0.68	0.939 3158	318.5	8.91	1.01	16 34.9
30	9 8 50.27	0.072	17 9 52.7	0.76	0.938 5535	316.7	8.92	1.01	16 31.0
c. 1	9 8 48.33	−0.090	+17 10 12.0	+0.85	0.937 7956	−314.8	8.94	1.02	16 27.0
2	9 8 45.94	0.109	17 10 33.3	0.93	0.937 0424	312.8	8.95	1.02	16 23.0
3	9 8 43.10	0.128	17 10 56.5	1.01	0.936 2942	310.6	8.97	1.02	16 19.0
4	9 8 39.81	0.146	17 11 21.6	1.09	0.935 5514	308.4	8.99	1.02	16 15.0
5	9 8 36.08	0.165	17 11 48.7	1.17	0.934 8141	306.0	9.00	1.02	16 11.0
6	9 8 31.91	−0.183	+17 12 17.7	+1.25	0.934 0827	−303.5	9.02	1.02	16 7.0
7	9 8 27.29	0.202	17 12 48.6	1.33	0.933 3574	300.9	9.03	1.03	16 3.0
8	9 8 22.23	0.220	17 13 21.5	1.41	0.932 6385	298.1	9.05	1.03	15 59.0
9	9 8 16.73	0.238	17 13 56.2	1.49	0.931 9264	295.2	9.06	1.03	15 55.0
10	9 8 10.79	0.256	17 14 32.8	1.56	0.931 2213	292.2	9.07	1.03	15 50.9
11	9 8 4.43	−0.274	+17 15 11.3	+1.64	0.930 5236	−289.2	9.09	1.03	15 46.9
12	9 7 57.63	0.292	17 15 51.7	1.72	0.929 8335	285.9	9.10	1.03	15 42.8
13	9 7 50.40	0.310	17 16 33.8	1.79	0.929 1514	282.5	9.12	1.04	15 38.8
14	9 7 42.75	0.328	17 17 17.8	1.87	0.928 4776	279.0	9.13	1.04	15 34.7
15	9 7 34.67	0.345	17 18 3.5	1.94	0.927 8123	275.4	9.15	1.04	15 30.7
16	9 7 26.18	−0.362	+17 18 51.0	+2.01	0.927 1559	−271.6	9.16	1.04	15 26.6
17	9 7 17.27	0.380	17 19 40.2	2.09	0.926 5086	267.8	9.17	1.04	15 22.5
18	9 7 7.96	0.396	17 20 31.1	2.15	0.925 8708	263.7	9.19	1.04	15 18.4
19	9 6 58.25	0.413	17 21 23.6	2.22	0.925 2427	259.6	9.20	1.05	15 14.3
20	9 6 48.14	0.429	17 22 17.8	2.30	0.924 6246	255.4	9.21	1.05	15 10.2
21	9 6 37.64	−0.446	+17 23 13.7	+2.36	0.924 0167	−251.1	9.23	1.05	15 6.1
22	9 6 26.75	0.461	17 24 11.1	2.42	0.923 4194	246.6	9.24	1.05	15 2.0
23	9 6 15.49	0.477	17 25 10.0	2.49	0.922 8328	242.1	9.25	1.05	14 57.9
24	9 6 3.85	0.493	17 26 10.5	2.55	0.922 2573	237.4	9.26	1.05	14 53.7
25	9 5 51.84	0.508	17 27 12.4	2.61	0.921 6931	232.7	9.28	1.05	14 49.6
26	9 5 39.48	−0.522	+17 28 15.7	+2.67	0.921 1403	−227.9	9.29	1.06	14 45.4
27	9 5 26.76	0.537	17 29 20.5	2.73	0.920 5993	222.9	9.30	1.06	14 41.3
28	9 5 13.69	0.552	17 30 26.6	2.78	0.920 0702	217.9	9.31	1.06	14 37.2
29	9 5 0.27	0.566	17 31 34.1	2.84	0.919 5533	212.8	9.32	1.06	14 33.0
30	9 4 46.52	0.580	17 32 42.9	2.89	0.919 0489	207.5	9.33	1.06	14 28.8
31	9 4 32.44	−0.594	+17 33 53.0	+2.95	0.918 5573	−202.1	9.34	1.06	14 24.7
32	*9 4 18.03*	. . .	*+17 35 4.4*	. . .	0.918 0786	. . .	9.35	1.06	14 20.5

FOR G MEAN NOON.

GREENWICH MEAN TIME.

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.	Var. per Day.	Apparent Declination.	Var. per Day.	Logarithm of Distance from Earth.	Var. per Day.	Semi-diameter.	Hor. Parallax.
	Noon.	*Noon.*	*Noon.*	*Noon.*	*Noon.*	*Noon.*	*Noon.*	*Noon.*
	h m s	s	° ′ ″	″			″	″
July 2	21 43 24.41	−5.894	−14 28 17.3	−31.77	1.283 8614	−2570.0	1.74	0.46
6	21 42 59.70	6.455	14 30 29.8	34.43	1.282 8710	2379.2	1.75	0.46
10	21 42 32.82	6.977	14 32 52.5	36.89	1.281 9598	2175.1	1.75	0.46
14	21 42 3.94	7.458	14 35 24.6	39.12	1.281 1326	1958.6	1.75	0.46
18	21 41 33.22	7.892	14 38 5.1	41.08	1.280 3946	1729.3	1.76	0.46
22	21 41 0.87	− 8.274	−14 40 52.9	−42.76	1.279 7506	−1489.0	1.76	0.46
26	21 40 27.10	8.599	14 43 46.8	44.15	1.279 2046	1239.9	1.76	0.46
30	21 39 52.15	8.868	14 46 45.7	45.22	1.278 7596	984.0	1.76	0.46
Aug. 3	21 39 16.23	9.080	14 49 48.2	46.01	1.278 4180	723.8	1.77	0.46
7	21 38 39.58	9.238	14 52 53.4	46.51	1.278 1812	458.4	1.77	0.46
11	21 38 2.40	− 9.339	−14 56 0.0	−46.72	1.278 0518	− 188.8	1.77	0.46
15	21 37 24.95	9.377	14 59 6.8	46.63	1.278 0305	+ 83.7	1.77	0.46
19	21 36 47.47	9.351	15 2 12.6	46.20	1.278 1188	356.5	1.77	0.46
23	21 36 10.23	9.259	15 5 16.0	45.45	1.278 3155	627.5	1.77	0.46
27	21 35 33.48	9.104	15 8 15.8	44.40	1.278 6204	895.7	1.76	0.46
31	21 34 57.48	− 8.888	−15 11 10.8	−43.05	1.279 0313	+1157.4	1.76	0.46
Sept. 4	21 34 22.45	8.618	15 13 59.9	41.48	1.279 5455	1412.7	1.76	0.46
8	21 33 48.61	8.293	15 16 42.3	39.65	1.280 1606	1661.9	1.76	0.46
12	21 33 16.18	7.910	15 19 16.7	37.50	1.280 8740	1903.9	1.76	0.46
16	21 32 45.41	7.468	15 21 42.0	35.13	1.281 6824	2135.9	1.75	0.46
20	21 32 16.51	− 6.972	−15 23 57.4	−32.51	1.282 5810	+2354.7	1.75	0.46
24	21 31 49.70	6.428	15 26 1.8	29.68	1.283 5644	2560.6	1.74	0.46
28	21 31 25.14	5.844	15 27 54.6	26.68	1.284 6275	2751.5	1.74	0.46
Oct. 2	21 31 3.00	5.220	15 29 35.0	23.52	1.285 7636	2927.5	1.74	0.46
6	21 30 43.43	4.561	15 31 2.5	20.20	1.286 9676	3089.6	1.73	0.45
10	21 30 26.56	− 3.867	−15 32 16.4	−16.75	1.288 2332	+3236.3	1.73	0.45
14	21 30 12.54	3.139	15 33 16.3	13.16	1.289 5544	3366.2	1.72	0.45
18	21 30 1.48	2.387	15 34 1.5	9.44	1.290 9237	3477.4	1.72	0.45
22	21 29 53.47	1.616	15 34 31.7	5.64	1.292 3338	3569.9	1.71	0.45
26	21 29 48.59	0.828	15 34 46.6	− 1.83	1.293 7771	3643.3	1.70	0.45
30	21 29 46.86	− 0.034	−15 34 46.3	+ 1.99	1.295 2461	+3699.3	1.70	0.45
Nov. 3	21 29 48.33	+ 0.768	15 34 30.6	5.86	1.296 7342	3737.8	1.69	0.44
7	21 29 53.01	1.572	15 33 59.4	9.75	1.298 2340	3758.6	1.69	0.44
11	21 30 0.91	2.379	15 33 12.6	13.64	1.299 7387	3761.8	1.68	0.44
15	21 30 12.04	3.186	15 32 10.3	17.51	1.301 2410	3746.7	1.67	0.44
19	21 30 26.38	+ 3.981	−15 30 52.6	+21.33	1.302 7335	+3712.3	1.67	0.44
23	21 30 43.86	4.756	15 29 19.8	25.04	1.304 2085	3660.3	1.66	0.44
27	21 31 4.40	5.512	15 27 32.4	28.67	1.305 6596	3592.3	1.66	0.43
Dec. 1	21 31 27.93	6.250	15 25 30.5	32.24	1.307 0804	3510.1	1.65	0.43
5	21 31 54.37	6.966	15 23 14.6	35.69	1.308 4656	3412.3	1.65	0.43
9	21 32 23.63	+ 7.660	−15 20 45.1	+39.04	1.309 8082	+3299.0	1.64	0.43
13	21 32 55.61	8.326	15 18 2.4	42.29	1.311 1030	3172.4	1.64	0.43
17	21 33 30.19	8.958	15 15 7.0	45.38	1.312 3442	3030.8	1.63	0.43
21	21 34 7.22	9.551	15 11 59.6	48.29	1.313 5259	2876.1	1.63	0.43
25	21 34 46.55	10.109	15 8 40.9	51.04	1.314 6437	2711.5	1.62	0.43
29	21 35 28.04	+10.629	−15 5 11.5	+53.62	1.315 6938	+2537.2	1.62	0.43
33	21 36 11.52	. . . .	−15 1 32.3	. . .	1.316 6720	. . . .	1.62	0.42

FOR GREENWICH MEAN NOON.

Date.		Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
		° ′ ″	″	″	° ′ ″	″		
n.	5	319 19 28.8	39.13	+7.0	−0 42 15.4	−0.22	1.300 2137	+18.8
	15	319 26 0.1	39.13	7.0	0 42 17.6	0.22	1.300 2325	18.8
	25	319 32 31.4	39.12	7.0	0 42 19.8	0.21	1.300 2513	18.8
b.	4	319 39 2.6	39.12	+7.0	−0 42 21.9	−0.21	1.300 2700	+18.7
	14	319 45 33.7	39.11	6.9	0 42 24.0	0.21	1.300 2886	18.6
	24	319 52 4.8	39.11	6.9	0 42 26.1	0.21	1.300 3071	18.6
r.	6	319 58 35.9	39.10	+6.9	−0 42 28.2	−0.21	1.300 3257	+18.5
	16	320 5 6.9	39.10	6.9	0 42 30.3	0.21	1.300 3441	18.4
	26	320 11 37.9	39.10	6.8	0 42 32.4	0.21	1.300 3624	18.3
r.	5	320 18 8.8	39.09	+6.8	−0 42 34.5	−0.21	1.300 3806	+18.2
	15	320 24 39.7	39.09	6.8	0 42 36.6	0.21	1.300 3989	18.2
	25	320 31 10.5	39.08	6.8	0 42 38.6	0.20	1.300 4171	18.1
y	5	320 37 41.3	39.08	+6.7	−0 42 40.7	−0.20	1.300 4352	+18.0
	15	320 44 12.0	39.07	6.7	0 42 42.7	0.20	1.300 4531	17.9
	25	320 50 42.7	39.07	6.7	0 42 44.8	0.20	1.300 4710	17.9
ne.	4	320 57 13.4	39.06	+6.7	−0 42 46.8	−0.20	1.300 4889	+17.8
	14	321 3 44.0	39.06	6.6	0 42 48.8	0.20	1.300 5067	17.8
	24	321 10 14.6	39.06	6.6	0 42 50.8	0.20	1.300 5244	17.7
ly	4	321 16 45.1	39.05	+6.6	−0 42 52.8	−0.20	1.300 5421	+17.7
	14	321 23 15.6	39.05	6.6	0 42 54.8	0.20	1.300 5597	17.6
	24	321 29 46.1	39.04	6.5	0 42 56.8	0.20	1.300 5772	17.5
g.	3	321 36 16.5	39.04	+6.5	−0 42 58.8	−0.20	1.300 5947	+17.5
	13	321 42 46.8	39.03	6.5	0 43 0.8	0.19	1.300 6121	17.4
	23	321 49 17.1	39.03	6.4	0 43 2.7	0.19	1.300 6295	17.3
pt.	2	321 55 47.4	39.02	+6.4	−0 43 4.6	−0.19	1.300 6468	+17.3
	12	322 2 17.6	39.02	6.4	0 43 6.5	0.19	1.300 6640	17.2
	22	322 8 47.8	39.02	6.4	0 43 8.5	0.19	1.300 6811	17.1
t.	2	322 15 18.0	39.01	+6.4	−0 43 10.4	−0.19	1.300 6982	+17.1
	12	322 21 48.1	39.01	6.3	0 43 12.3	0.19	1.300 7152	17.0
	22	322 28 18.1	39.00	6.3	0 43 14.2	0.19	1.300 7322	16.9
v.	1	322 34 48.1	39.00	+6.3	−0 43 16.1	−0.19	1.300 7491	+16.8
	11	322 41 18.1	39.00	6.2	0 43 17.9	0.18	1.300 7658	16.7
	21	322 47 48.1	38.99	6.2	0 43 19.8	0.18	1.300 7826	16.7
c.	1	322 54 18.0	38.99	+6.2	−0 43 21.6	−0.18	1.300 7993	+16.6
	11	323 0 47.8	38.98	6.2	0 43 23.5	0.18	1.300 8159	16.6
	21	323 7 17.6	38.98	6.1	0 43 25.3	0.18	1.300 8324	16.5
	31	323 13 47.4	38.97	+6.1	−0 43 27.2	−0.18	1.300 8489	+16.5
	41	323 20 17.1	38.97	+6.1	−0 43 29.0	−0.18	1.300 8654	+16.4

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension.	Var. per Day.	Apparent Declination.	Var. per Day.	Logarithm of Distance from Earth.	Var. per Day.	Semi-diameter.	Hor. Parallax.
	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.	Noon.
	h m s	s	° ′ ″	″			″	″
Jan. 3	8 25 19.89	−6.346	+19 0 58.6	+22.35	1.463 9859	− 944.7	1.33	0.30
7	8 24 54.08	6.554	19 2 29.4	23.04	1.463 6430	770.4	1.33	0.30
11	8 24 27.51	6.722	19 4 2.7	23.57	1.463 3701	592.4	1.33	0.30
15	8 24 0.36	6.849	19 5 37.8	23.97	1.463 1697	409.3	1.33	0.30
19	8 23 32.78	6.930	19 7 14.3	24.24	1.463 0430	223.7	1.33	0.30
23	8 23 4.98	−6.964	+19 8 51.5	+24.31	1.462 9910	− 36.1	1.33	0.30
27	8 22 37.13	6.950	19 10 28.6	24.22	1.463 0141	+ 151.1	1.33	0.30
31	8 22 9.44	6.888	19 12 5.1	23.99	1.463 1116	336.2	1.33	0.30
Feb. 4	8 21 42.08	6.783	19 13 40.3	23.60	1.463 2827	519.0	1.33	0.30
8	8 21 15.23	6.637	19 15 13.7	23.07	1.463 5263	697.9	1.33	0.30
12	8 20 49.04	−6.448	+19 16 44.7	+22.30	1.463 8404	+ 871.9	1.33	0.30
16	8 20 23.70	6.218	19 18 12.7	21.61	1.464 2233	1042.5	1.33	0.30
20	8 19 59.35	5.948	19 19 37.4	20.68	1.464 6736	1207.0	1.33	0.30
24	8 19 36.17	5.636	19 20 58.0	19.62	1.465 1879	1363.9	1.32	0.30
28	8 19 14.31	5.288	19 22 14.2	18.46	1.465 7635	1511.8	1.32	0.30
Mar. 4	8 18 53.91	−4.907	+19 23 25.5	+17.18	1.466 3960	+1649.7	1.32	0.30
8	8 18 35.09	4.498	19 24 31.5	15.83	1.467 0820	1778.5	1.32	0.30
12	8 18 17.96	4.063	19 25 32.0	14.39	1.467 8175	1897.7	1.32	0.30
16	8 18 2.62	3.604	19 26 26.5	12.87	1.468 5988	2007.1	1.31	0.30
20	8 17 49.16	3.123	19 27 14.9	11.28	1.469 4217	2105.2	1.31	0.30
24	8 17 37.67	−2.616	+19 27 56.7	+ 9.63	1.470 2815	+2192.5	1.31	0.30
28	8 17 28.25	2.094	19 28 31.9	7.92	1.471 1740	2267.1	1.31	0.30
Apr. 1	8 17 20.93	1.564	19 29 0.2	6.19	1.472 0935	2328.9	1.30	0.30
5	8 17 15.75	1.023	19 29 21.4	4.44	1.473 0356	2379.6	1.30	0.30
9	8 17 12.75	−0.478	19 29 35.7	2.70	1.473 9956	2418.1	1.30	0.30
13	8 17 11.93	+0.070	+19 29 42.9	+ 0.89	1.474 9686	+2445.7	1.29	0.29
17	8 17 13.32	0.625	19 29 42.8	− 0.93	1.475 9507	2462.5	1.29	0.29
21	8 17 16.93	1.179	19 29 35.4	2.74	1.476 9370	2467.2	1.29	0.29
25	8 17 22.75	1.730	19 29 20.9	4.52	1.477 9228	2459.5	1.29	0.29
29	8 17 30.76	2.272	19 28 59.2	6.32	1.478 9030	2439.8	1.28	0.29
May 3	8 17 40.91	+2.802	+19 28 30.4	− 8.07	1.479 8732	+2409.2	1.28	0.29
7	8 17 53.16	3.321	19 27 54.7	9.78	1.480 8291	2369.3	1.28	0.29
11	8 18 7.46	3.826	19 27 12.2	11.47	1.481 7674	2320.6	1.27	0.29
15	8 18 23.75	4.318	19 26 23.0	13.13	1.482 6842	2261.5	1.27	0.29
19	8 18 41.99	4.798	19 25 27.2	14.75	1.483 5753	2192.5	1.27	0.29
23	8 19 2.11	+5.258	+19 24 25.1	−16.31	1.484 4370	+2114.5	1.27	0.29
27	8 19 24.03	5.698	19 23 16.8	17.82	1.485 2657	2027.6	1.26	0.29
31	8 19 47.66	6.111	19 22 2.6	19.26	1.486 0580	1932.7	1.26	0.29
June 4	8 20 12.89	6.501	19 20 42.8	20.63	1.486 8110	1830.7	1.26	0.29
8	8 20 39.64	6.870	19 19 17.6	21.95	1.487 5217	1722.5	1.26	0.29
12	8 21 7.82	+7.217	+19 17 47.3	−23.20	1.488 1882	+1608.9	1.26	0.29
16	8 21 37.34	7.537	19 16 12.1	24.39	1.488 8079	1487.9	1.25	0.29
20	8 22 8.08	7.830	19 14 32.3	25.49	1.489 3777	1360.7	1.25	0.28
24	8 22 39.94	8.095	19 12 48.3	26.49	1.489 8958	1228.5	1.25	0.28
28	8 23 12.80	8.331	19 11 0.5	27.40	1.490 3599	1091.5	1.25	0.28
July 2	8 23 46.55	+8.536	+19 9 9.2	−28.23	1.490 7686	+ 951.4	1.25	0.28
6	8 24 21.05	+8.710	+19 7 14.8	−28.96	1.491 1207	+ 809.2	1.25	0.28

GREENWICH MEAN TIME.

Date.	Apparent Right Ascension. Noon.	Var. per Day. Noon.	Apparent Declination. Noon.	Var. per Day. Noon.	Logarithm of Distance from Earth. Noon.	Var. per Day. Noon.	Semi-diameter. Noon.	Hor. Parallax. Noon.	Transit, Meridian of Greenwich.
	h m s	s	° ′ ″	″			″	″	h m
July 2	8 23 46.55	+8.536	+19 9 9.2	−28.23	1.490 7686	+ 951.4	1.25	0.28	1 43.7
6	8 24 21.05	8.710	19 7 14.8	28.96	1.491 1207	809.2	1.25	0.28	1 28.6
10	8 24 56.20	8.861	19 5 17.6	29.63	1.491 4155	663.5	1.25	0.28	1 13.4
14	8 25 31.90	8.983	19 3 17.9	30.19	1.491 6511	514.7	1.25	0.28	0 58.3
18	8 26 8.02	9.073	19 1 16.2	30.66	1.491 8269	363.3	1.25	0.28	0 43.1
22	8 26 44.44	+9.129	+18 59 12.8	−30.99	1.491 9415	+ 210.2	1.25	0.28	0 28.0
26	8 27 21.02	9.153	18 57 8.4	31.22	1.491 9950	+ 56.8	1.25	0.28	0 12.9
30	8 27 57.62	9.145	18 55 3.2	31.34	1.491 9869	− 97.0	1.25	0.28	23 54.0
Aug. 3	8 28 34.13	9.106	18 52 57.8	31.37	1.491 9176	248.8	1.25	0.28	23 38.9
7	8 29 10.45	9.047	18 50 52.4	31.29	1.491 7879	400.6	1.25	0.28	23 23.7
11	8 29 46.46	+8.952	+18 48 47.6	−31.11	1.491 5971	− 552.9	1.25	0.28	23 8.6
15	8 30 22.02	8.824	18 46 43.7	30.79	1.491 3458	703.3	1.25	0.28	22 53.4
19	8 30 57.01	8.665	18 44 41.4	30.37	1.491 0348	851.4	1.25	0.28	22 38.3
23	8 31 31.30	8.475	18 42 40.9	29.83	1.490 6651	996.1	1.25	0.28	22 23.1
27	8 32 4.77	8.255	18 40 42.9	29.15	1.490 2384	1137.1	1.25	0.28	22 7.9
31	8 32 37.30	+8.007	+18 38 47.8	−28.38	1.489 7560	−1273.9	1.25	0.28	21 52.8
Sept. 4	8 33 8.79	7.733	18 36 56.0	27.52	1.489 2199	1406.0	1.25	0.28	21 37.6
8	8 33 39.13	7.433	18 35 7.8	26.55	1.488 6318	1533.7	1.25	0.29	21 22.3
12	8 34 8.22	7.105	18 33 23.8	25.43	1.487 9936	1656.8	1.26	0.29	21 7.1
16	8 34 35.93	6.746	18 31 44.5	24.22	1.487 3072	1773.8	1.26	0.29	20 51.8
20	8 35 2.15	+6.360	+18 30 10.2	−22.91	1.486 5756	−1883.1	1.26	0.29	20 36.5
24	8 35 26.78	5.952	18 28 41.4	21.46	1.485 8018	1984.4	1.26	0.29	20 21.2
28	8 35 49.74	5.523	18 27 18.6	19.95	1.484 9892	2077.5	1.27	0.29	20 5.9
Oct. 2	8 36 10.94	5.074	18 26 1.9	18.36	1.484 1409	2162.6	1.27	0.29	19 50.5
6	8 36 30.31	4.607	18 24 51.8	16.69	1.483 2602	2239.9	1.27	0.29	19 35.1
10	8 36 47.77	+4.119	+18 23 48.5	−14.93	1.482 3502	−2308.0	1.27	0.29	19 19.6
14	8 37 3.24	3.613	18 22 52.5	13.07	1.481 4152	2365.8	1.28	0.29	19 4.1
18	8 37 16.65	3.089	18 22 4.0	11.16	1.480 4590	2413.1	1.28	0.29	18 48.6
22	8 37 27.94	2.555	18 21 23.3	9.19	1.479 4863	2448.5	1.28	0.29	18 33.1
26	8 37 37.08	2.014	18 20 50.5	7.19	1.478 5017	2472.5	1.28	0.29	18 17.5
30	8 37 44.04	+1.465	+18 20 25.8	− 5.15	1.477 5098	−2485.4	1.29	0.29	18 1.9
Nov. 3	8 37 48.79	0.911	18 20 9.3	3.10	1.476 5148	2487.8	1.29	0.29	17 46.2
7	8 37 51.32	+0.353	18 20 1.0	− 1.03	1.475 5212	2477.7	1.29	0.29	17 30.5
11	8 37 51.61	−0.206	18 20 1.1	+ 1.08	1.474 5343	2455.1	1.30	0.29	17 14.8
15	8 37 49.67	0.765	18 20 9.6	3.17	1.473 5588	2420.0	1.30	0.30	16 59.0
19	8 37 45.50	−1.316	+18 20 26.4	+ 5.22	1.472 6001	−2371.4	1.30	0.30	16 43.2
23	8 37 39.16	1.855	18 20 51.3	7.23	1.471 6634	2310.1	1.30	0.30	16 27.4
27	8 37 30.68	2.381	18 21 24.2	9.20	1.470 7536	2237.3	1.31	0.30	16 11.5
Dec. 1	8 37 20.13	2.891	18 22 4.8	11.09	1.469 8751	2153.2	1.31	0.30	15 55.6
5	8 37 7.57	3.387	18 22 52.8	12.92	1.469 0326	2057.7	1.31	0.30	15 39.7
9	8 36 53.06	−3.861	+18 23 48.1	+14.69	1.468 2305	−1950.4	1.32	0.30	15 23.7
13	8 36 36.71	4.312	18 24 50.2	16.36	1.467 4739	1830.8	1.32	0.30	15 7.7
17	8 36 18.60	4.735	18 25 58.8	17.91	1.466 7673	1700.8	1.32	0.30	14 51.7
21	8 35 58.87	5.126	18 27 13.3	19.33	1,466 1146	1560.7	1.32	0.30	14 35.6
25	8 35 37.64	5.481	18 28 33.3	20.62	1.465 5199	1412.1	1.32	0.30	14 19.5
29	8 35 15.07	−5.794	+18 29 58.1	+21.77	1.464 9859	−1256.6	1.33	0.30	14 3.4
33	8 34 51.29	....	*+18 31 27.3*	....	1.464 5158	....	1.33	0.30	13 47.3

FOR GREENWICH MEAN NOON.

Date.		Heliocentric Longitude, Mean Equinox of Date.	Var. per Day.	Reduction to Orbit.	Heliocentric Latitude.	Var. per Day.	Logarithm of Radius Vector.	Var. per Day.
		° ′ ″	″	″	° ′ ″	″		
Jan.	5	123 22 54.7	21.74	−12.8	−0 13 53.4	+0.67	1.477 4598	+4.8
	15	123 26 32.1	21.74	12.7	0 13 46.7	0.67	1.477 4647	4.8
	25	123 30 9.5	21.74	12.6	0 13 40.0	0.67	1.477 4695	4.8
Feb.	4	123 33 47.0	21.74	−12.5	−0 13 33.3	+0.67	1.477 4743	+4.8
	14	123 37 24.4	21.74	12.4	0 13 26.7	0.67	1.477 4792	4.8
	24	123 41 1.8	21.74	12.3	0 13 20.0	0.67	1.477 4840	4.8
Mar.	6	123 44 39.2	21.74	−12.2	−0 13 13.4	+0.67	1.477 4889	+4.8
	16	123 48 16.7	21.74	12.1	0 13 6.7	0.67	1.477 4937	4.8
	26	123 51 54.1	21.74	12.0	0 13 0.1	0.67	1.477 4986	4.8
Apr.	5	123 55 31.6	21.74	−11.9	−0 12 53.4	+0.67	1.477 5034	+4.8
	15	123 59 9.0	21.74	11.8	0 12 46.7	0.67	1.477 5082	4.8
	25	124 2 46.5	21.74	11.7	0 12 40.0	0.67	1.477 5130	4.8
May	5	124 6 23.9	21.74	−11.6	−0 12 33.4	+0.67	1.477 5178	+4.8
	15	124 10 1.4	21.74	11.5	0 12 26.7	0.67	1.477 5226	4.8
	25	124 13 38.8	21.74	11.4	0 12 20.0	0.67	1.477 5274	4.8
June	4	124 17 16.3	21.74	−11.3	−0 12 13.3	+0.67	1.477 5322	+4.8
	14	124 20 53.7	21.75	11.2	0 12 6.7	0.67	1.477 5370	4.8
	24	124 24 31.2	21.75	11.1	0 12 0.0	0.67	1.477 5418	4.8
July	4	124 28 8.6	21.75	−11.0	−0 11 53.3	+0.67	1.477 5466	+4.8
	14	124 31 46.1	21.75	10.9	0 11 46.6	0.67	1.477 5513	4.8
	24	124 35 23.5	21.75	10.8	0 11 39.9	0.67	1.477 5561	4.8
Aug.	3	124 39 1.0	21.75	−10.7	−0 11 33.2	+0.67	1.477 5609	+4.8
	13	124 42 38.5	21.75	10.6	0 11 26.5	0.67	1.477 5657	4.8
	23	124 46 16.0	21.75	10.5	0 11 19.8	0.67	1.477 5704	4.8
Sept.	2	124 49 53.4	21.75	−10.4	−0 11 13.2	+0.67	1.477 5752	+4.7
	12	124 53 30.9	21.75	10.3	0 11 6.5	0.67	1.477 5799	4.7
	22	124 57 8.4	21.75	10.2	0 10 59.8	0.67	1.477 5847	4.7
Oct.	2	125 0 45.9	21.75	−10.1	−0 10 53.1	+0.67	1.477 5894	+4.7
	12	125 4 23.3	21.75	10.0	0 10 46.4	0.67	1.477 5941	4.7
	22	125 8 0.8	21.75	9.9	0 10 39.7	0.67	1.477 5988	4.7
Nov.	1	125 11 38.3	21.75	− 9.8	−0 10 33.0	+0.67	1.477 6035	+4.7
	11	125 15 15.8	21.75	9.7	0 10 26.3	0.67	1.477 6082	4.7
	21	125 18 53.3	21.75	9.6	0 10 19.7	0.67	1.477 6129	4.7
Dec.	1	125 22 30.8	21.75	− 9.5	−0 10 13.0	+0.67	1.477 6176	+4.7
	11	125 26 8.3	21.75	9.4	0 10 6.3	0.67	1.477 6223	4.7
	21	125 29 45.8	21.75	9.3	0 9 59.6	0.67	1.477 6269	4.7
	31	125 33 23.3	21.75	− 9.2	−0 9 52.9	+0.67	1.477 6316	+4.7
	41	125 37 0.8	21.75	− 9.1	−0 9 46.2	+0.67	1.477 6362	+4.6

PART II.

ASTRONOMICAL EPHEMERIS FOR THE MERIDIAN OF WASHINGTON.

The constants of precession, nutation and aberration adopted by the C*férence Internationale des Étoiles Fondamentales* which met in Paris in M 1896, are given on page xviii, and together with the notation of BESSEL used in the formulæ which follow.

BESSELIAN STAR-NUMBERS.

Terms of Long Period.	*Terms of Short Period.*
$A=\tau-\ 0.342\ 20 \sin \Omega$	$-0.004\ 05 \sin 2$ ☾
$+\ 0.004\ 15 \sin 2\Omega$	$+0.000\ 23 \sin ($☾$+\Gamma')$
$-\ 0.025\ 26 \sin 2\,\mathrm{L}$	$+0.001\ 34 \sin ($☾$-\Gamma')$
$+\ 0.002\ 51 \sin (\mathrm{L}-\Gamma)$	$-0.000\ 68 \sin (2$☾$-\Omega)$
$-\ 0.000\ 99 \sin (3\,\mathrm{L}-\Gamma)$	$-0.000\ 52 \sin (3$☾$-\Gamma')$
$+\ 0.000\ 42 \sin (\mathrm{L}+\Gamma)$	$+0.000\ 30 \sin ($☾$-2\,\mathrm{L}+\Gamma')$
$+\ 0.000\ 25 \sin (2\,\mathrm{L}-\Omega)$	$+0.000\ 12 \sin 2($☾$-\mathrm{L})$
$''$	$''$
$B=-\ 9.210 \cos \Omega$	$-0.088 \cos 2$☾
$+\ 0.090 \cos 2\Omega$	$-0.018 \cos (2$☾$-\Omega)$
$-\ 0.552 \cos 2\,\mathrm{L}$	$-0.011 \cos (3$☾$-\Gamma')$
$-\ 0.022 \cos (3\,\mathrm{L}-\Gamma)$	$+0.005 \cos ($☾$+\Gamma')$
$+\ 0.009 \cos (\mathrm{L}+\Gamma)$	
$+\ 0.007 \cos (2\,\mathrm{L}-\Omega)$	

$$C=\ -20.4700 \cos \omega \cos \odot$$

$$D=\ -20.4700 \sin \odot$$

$$E=\ -\ 0.0416 \sin \Omega + 0''.0005 \sin 2\Omega - 0''.0031 \sin 2\,\mathrm{L}$$

BESSEL'S *Star-Constants.*

$a=3^s.072\ 65+1^s.336\ 36 \sin \alpha_0 \tan \delta_0$ $\qquad a'=20''.0454 \cos \alpha_0$

$b=\frac{1}{15} \cos \alpha_0 \tan \delta_0$ $\qquad b'=-\sin \alpha_0$

$c=\frac{1}{15} \cos \alpha_0 \sec \delta_0$ $\qquad c'=\tan \omega \cos \delta_0-\sin \alpha_0 \sin \delta_0$

$d=\frac{1}{15} \sin \alpha_0 \sec \delta_0$ $\qquad d'=\cos \alpha_0 \sin \delta_0$

Formulæ for reduction to Apparent Position.

$$\alpha=\alpha_0+\tau\mu+Aa+Bb+Cc+Dd+\tfrac{1}{15}E \quad \text{(in time)}$$
$$\delta=\delta_0+\tau\mu'+Aa'+Bb'+Cc'+Dd' \quad \text{(in arc)}$$

INDEPENDENT STAR-NUMBERS.

$$f+f'=+46''.0898\,A+E \quad \text{(in arc)}$$
$$=+3^s.07265\,A+\tfrac{1}{15}E \quad \text{(in time)}$$
$$f'=-0^s.0124 \sin 2☾+0^s.0041 \sin (☾-\Gamma')+0^s.0007 \sin (☾+\Gamma')$$
$$-0^s.0021 \sin (2☾-\Omega)-0^s.0016 \sin (3☾-\Gamma')$$
$$+0^s.0009 \sin (☾-2\,\mathrm{L}+\Gamma')+0^s.0004 \sin 2(☾-\mathrm{L})$$

$g \sin G=B$ $\qquad h \sin H=C$ $\qquad i=C \tan \omega$

$g \cos G=20''.0454\,A$ $\qquad h \cos H=D$

Formulæ for Reduction to Apparent Position.

$$\alpha=\alpha_0+f+f'+\tau\mu+\tfrac{1}{15}\,g \sin (G+\alpha_0) \tan \delta_0+\tfrac{1}{15}\,h \sin (H+\alpha_0) \sec \delta_0 \quad \text{(in time)}$$
$$\delta=\delta_0+\tau\mu'+g \cos (G+\alpha_0)+h \cos (H+\alpha_0) \sin \delta_0+i \cos \delta_0 \quad \text{(in arc)}$$

In the above formulæ,

τ denotes the time reckoned in units of one year, from the beginning of Besselian fictitious year (1917, January $0^d.217$, Washington m time),

α_0, δ_0, the star's mean R. A. and Decl. at the beginning of the fictitious y

α, δ, the star's apparent right ascension and declination at the time τ,

μ, μ', the annual proper motion in right ascension and declination,

$\odot$, the Sun's true longitude,
L, the Sun's mean longitude,
Ω, the longitude of the Moon's ascending node,

ω, the obliquity of the eclipti
Γ, the long. of the Sun's perig
Γ', the long. of the Moon's peri
☾, the Moon's mean longitud

The independent star-numbers are more convenient than BESSEL's when one or two apparent positions of a star are required, or when BESSEL's constants are not known with sufficient accuracy.

n using the star-constants of the *British Association Catalogue*, a, b, c, d, , c', d', with the star-numbers of this Ephemeris, the quantities to be uted are Ac, Bd, Ca, Db, $-Ac'$, $-Bd'$, $-Ca'-Db'$.

the computation of the Besselian star-numbers given for Washington midnight of each day of the year, on pages 202–205, the short period —that is, the terms involving the Moon's mean longitude—have been ded.

n the computation of the independent star-numbers, pages 206–213, the -period terms have been included in the two columns headed G and Log g. uantities f and f' give separately the effect of the long period and short- d terms. f' differs but slightly from the quantity $-0''.1866 \sin 2 ☾ +$ 22 $\sin (☾ - \Gamma')$ given on page 37 of the *Procès-Verbaux* of the Paris Conce of 1896, which quantity that conference decided should be omitted in eduction of stars from mean to apparent place.

n computing the ephemerides of the circumpolar stars in this volume, ort-period terms have been included. The quantity f', which was omitted the ephemerides of the circumpolar stars given in the *American Ephemeris Nautical Almanac* for the years 1900 to 1915, inclusive, is now included in ephemerides in accordance with the decision of the *Congrès International Éphémérides Astronomiques* held at Paris in October, 1911. See page 43 *ocès-Verbaux* of that Congress.

In the computation of the ephemerides of the ten-day stars, no short-period s have been included. These terms attain two maxima and two minima g the tropical month. At maximum and minimum they may amount in ascension to $\pm 0^s.008 \tan \delta$, and in declination to $\pm 0''.13$. For com- g the effect of these terms for the correction of the positions of stars inter- ted from the ten-day ephemerides, the following formulæ may be used, in h $\Delta\alpha$ and $\Delta\delta$ denote the effect of the short-period terms in right ascension declination, respectively, and $\delta''\psi$ and $\delta''\omega$, the sum of the short-period s of the nutation in longitude and obliquity:

$$\Delta\alpha = D_\psi\alpha \; \delta''\psi + D_\omega\alpha \; \delta''\omega$$
$$\Delta\delta = D_\psi\delta \; \delta''\psi + D_\omega\delta \; \delta''\omega$$

The values of $\delta''\psi$ and of $\delta''\omega$ for Washington mean midnight are given for day of the year on pages 215–216, and have been computed as follows:

$$\delta''\psi = 50''.37 \, A_2 \qquad\qquad \delta''\omega = -B_2$$

hich A_2 and B_2 are the sums of the short-period terms given in the expres- s for A and B on page 200.

The quantities $D_\psi\alpha$, $D_\omega\alpha$, $D_\psi\delta$, and $D_\omega\delta$ are given for each ten-day star pages 316–513, and have been computed by means of the following formulæ:

$$D_\psi\alpha = \tfrac{1}{15} (\cos \omega + \sin \alpha \tan \delta \sin \omega) \qquad D_\omega\alpha = -\tfrac{1}{15} \cos \alpha \tan \delta$$
$$D_\psi\delta = \cos \alpha \sin \omega \qquad D_\omega\delta = \sin \alpha$$

In the *Star List of the American Ephemeris* for the years 1910 and 1911 in the *American Ephemeris and Nautical Almanac* for the years 1912 to 5, inclusive, the value used for the derivative of the right ascension with rence to ψ was

$$D'_\psi\alpha = \tfrac{1}{15} \sin \alpha \tan \delta \sin \omega$$

the addition of the term $\frac{1}{15} \cos \omega$ is made in accordance with the above- ntioned decision *of the Congrès International des* Éphémérides Astronomiques 1911 *with reference to the* quantity f'.

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hr.)	Log *A*.	Log *B*.	Log *C*.	Log *D*.	Solar Day. (Sid. Hr.)	Log *A*.	Log *B*.	Log *C*.
Jan. 0	+9.51342	−0.4500	−0.52391	+1.30413	Feb. 15	+9.67399	−0.4817	−1.19718
1	9.51677	0.4437	0.56460	1.30267	16	9.67843	0.4821	1.20206
2	9.52128	0.4364	0.60168	1.30105	17	9.68278	0.4858	1.20674
3	9.52686	0.4297	0.63570	1.29930	h 18	9.68668	0.4922	1.21124
h 4	9.53322	0.4252	0.66713	1.29740	(10.0) 19	9.68965	0.5001	1.21557
(7.0) 5	+9.53988	−0.4235	−0.69630	+1.29535	20	+9.69167	−0.5077	−1.21971
6	9.54637	0.4248	0.72351	1.29316	21	9.69277	0.5136	1.22368
7	9.55236	0.4288	0.74898	1.29082	22	9.69326	0.5167	1.22748
8	9.55758	0.4346	0.77290	1.28832	23	9.69364	0.5164	1.23111
9	9.56190	0.4411	0.79545	1.28568	24	9.69433	0.5133	1.23458
10	+9.56540	−0.4474	−0.81675	+1.28288	25	+9.69562	−0.5084	−1.23788
11	9.56812	0.4528	0.83692	1.27992	26	9.69774	0.5029	1.24103
12	9.57019	0.4565	0.85607	1.27681	27	9.70049	0.4983	1.24402
13	9.57201	0.4579	0.87427	1.27354	28	9.70370	0.4958	1.24685
14	9.57388	0.4568	0.89161	1.27010	Mar. 1	9.70697	0.4957	1.24954
15	+9.57616	−0.4534	−0.90815	+1.26650	2	+9.71005	−0.4980	−1.25207
16	9.57933	0.4483	0.92395	1.26272	3	9.71271	0.5022	1.25445
17	9.58354	0.4427	0.93906	1.25878	4	9.71483	0.5073	1.25669
18	9.58883	0.4382	0.95353	1.25466	5	9.71635	0.5126	1.25878
h 19	9.59493	0.4362	0.96740	1.25037	h 6	9.71730	0.5172	1.26073
(8.0) 20	+9.60133	−0.4378	−0.98070	+1.24590	(11.0) 7	+9.71780	−0.5206	−1.26254
21	9.60746	0.4430	0.99348	1.24124	8	9.71798	0.5222	1.26421
22	9.61271	0.4510	1.00575	1.23639	9	9.71806	0.5217	1.26574
23	9.61682	0.4601	1.01756	1.23135	10	9.71829	0.5190	1.26713
24	9.61966	0.4683	1.02891	1.22611	11	9.71893	0.5144	1.26838
25	+9.62150	−0.4743	−1.03983	+1.22067	12	+9.72021	−0.5085	−1.26950
26	9.62280	0.4769	1.05036	1.21503	13	9.72228	0.5025	1.27049
27	9.62410	0.4761	1.06049	1.20918	14	9.72507	0.4976	1.27134
28	9.62586	0.4726	1.07026	1.20311	15	9.72839	0.4951	1.27206
29	9.62843	0.4675	1.07968	1.19682	16	9.73182	0.4956	1.27265
30	+9.63190	−0.4626	−1.08876	+1.19030	17	+9.73500	−0.4990	−1.27310
31	9.63603	0.4592	1.09752	1.18354	18	9.73753	0.5043	1.27342
Feb. 1	9.64053	0.4583	1.10597	1.17654	19	9.73924	0.5100	1.27362
2	9.64504	0.4601	1.11412	1.16929	20	9.74009	0.5145	1.27368
h 3	9.64921	0.4645	1.12198	1.16178	h 21	9.74037	0.5164	1.27361
(9.0) 4	+9.65284	−0.4706	−1.12957	+1.15400	(12.0) 22	+9.74039	−0.5151	−1.27341
5	9.65577	0.4776	1.13689	1.14595	23	9.74066	0.5106	1.27308
6	9.65798	0.4846	1.14395	1.13761	24	9.74145	0.5038	1.27262
7	9.65959	0.4907	1.15077	1.12897	25	9.74290	0.4960	1.27203
8	9.66068	0.4954	1.15734	1.12002	26	9.74509	0.4884	1.27131
9	+9.66142	−0.4980	−1.16368	+1.11075	27	+9.74775	−0.4826	−1.27046
10	9.66211	0.4984	1.16980	1.10114	28	9.75064	0.4792	1.26948
11	9.66303	0.4965	1.17569	1.09117	29	9.75344	0.4784	1.26837
12	9.66452	0.4928	1.18137	1.08084	30	9.75588	0.4797	1.26713
13	9.66683	0.4883	1.18684	1.07012	31	9.75791	0.4824	1.26575
14	+9.67004	−0.4841	−1.19211	+1.05900	Apr. 1	+9.75937	−0.4855	−1.26424
15	+9.67399	−0.4817	−1.19718	+1.04745	2	+9.76035	−0.4882	−1.26260

E = +0″.04 = +0ˢ.003

FOR WASHINGTON MEAN MIDNIGHT.

Log *A*.	Log *B*.	Log *C*.	Log *D*.	Solar Day. (Sid. Hr.)	Log *A*.	Log *B*.	Log *C*.	Log *D*.
+9.75937	−0.4855	−1.26424	−0.62542	May 17	+9.83469	−0.3062	−1.01346	−1.23314
9.76035	0.4882	1.26260	0.65942	18	9.83619	0.2912	1.00215	1.23785
9.76090	0.4898	1.26083	0.69082	19	9.83834	0.2752	0.99041	1.24239
9.76116	0.4897	1.25892	0.71997	20	9.84100	0.2605	0.97823	1.24675
9.76130	0.4874	1.25687	0.74714	h 21	9.84402	0.2492	0.96558	1.25096
+9.76153	−0.4827	−1.25469	−0.77258	(16.0) 22	+9.84716	−0.2424	−0.95242	−1.25499
9.76205	0.4758	1.25237	0.79647	23	9.85012	0.2402	0.93873	1.25887
9.76313	0.4672	1.24991	0.81899	24	9.85277	0.2415	0.92448	1.26259
9.76490	0.4580	1.24731	0.84026	25	9.85502	0.2448	0.90962	1.26616
9.76736	0.4494	1.24456	0.86041	26	9.85681	0.2484	0.89412	1.26957
+9.77036	−0.4430	−1.24167	−0.87953	27	+9.85820	−0.2510	−0.87792	−1.27284
9.77363	0.4397	1.23864	0.89772	28	9.85931	0.2513	0.86098	1.27596
9.77674	0.4401	1.23546	0.91505	29	9.86020	0.2486	0.84322	1.27894
9.77938	0.4430	1.23213	0.93158	30	9.86111	0.2422	0.82459	1.28177
9.78132	0.4471	1.22865	0.94737	31	9.86218	0.2320	0.80500	1.28446
+9.78252	−0.4505	−1.22501	−0.96248	June 1	+9.86355	−0.2185	−0.78438	−1.28702
9.78309	0.4515	1.22122	0.97696	2	9.86541	0.2025	0.76260	1.28944
9.78335	0.4490	1.21727	0.99083	3	9.86781	0.1863	0.73955	1.29172
9.78373	0.4427	1.21315	1.00415	4	9.87073	0.1723	0.71509	1.29387
9.78453	0.4332	1.20887	1.01695	h 5	9.87400	0.1631	0.68905	1.29589
+9.78596	−0.4218	−1.20443	−1.02925	(17.0) 6	+9.87736	−0.1604	−0.66122	−1.29778
9.78809	0.4102	1.19981	1.04108	7	9.88052	0.1642	0.63137	1.29954
9.79074	0.4001	1.19502	1.05247	8	9.88321	0.1723	0.59918	1.30117
9.79369	0.3928	1.19006	1.06344	9	9.88528	0.1817	0.56430	1.30268
9.79665	0.3887	1.18491	1.07401	10	9.88672	0.1889	0.52624	1.30406
+9.79938	−0.3875	−1.17957	−1.08420	11	+9.88774	−0.1912	−0.48439	−1.30531
9.80174	0.3884	1.17405	1.09403	12	9.88856	0.1871	0.43795	1.30644
9.80362	0.3903	1.16833	1.10351	13	9.88955	0.1764	0.38580	1.30745
9.80502	0.3921	1.16241	1.11266	14	9.89091	0.1607	0.32641	1.30833
9.80602	0.3928	1.15629	1.12150	15	9.89281	0.1426	0.25744	1.30909
+9.80675	−0.3916	−1.14996	−1.13004	16	+9.89522	−0.1255	−0.17532	−1.30973
9.80729	0.3879	1.14341	1.13828	17	9.89802	0.1125	0.07374	1.31025
9.80790	0.3814	1.13664	1.14624	18	9.90096	0.1057	9.94082	1.31065
9.80874	0.3720	1.12963	1.15394	19	9.90384	0.1054	9.74814	1.31093
9.81000	0.3602	1.12239	1.16137	h 20	9.90644	0.1107	−9.39300	1.31108
+9.81188	−0.3471	−1.11491	−1.16855	(18.0) 21	+9.90871	−0.1193	+8.81701	−1.31112
9.81438	0.3343	1.10718	1.17550	22	9.91054	0.1289	9.57789	1.31103
9.81741	0.3235	1.09918	1.18221	23	9.91202	0.1375	9.83943	1.31082
9.82077	0.3167	1.09090	1.18869	24	9.91318	0.1435	0.00142	1.31050
9.82412	0.3145	1.08235	1.19495	25	9.91414	0.1458	0.11901	1.31005
+9.82713	−0.3164	−1.07350	−1.20100	26	+9.91501	−0.1436	+0.21136	−1.30948
9.82953	0.3208	1.06434	1.20684	27	9.91595	0.1371	0.28735	1.30879
9.83128	0.3252	1.05486	1.21248	28	9.91712	0.1264	0.35190	1.30798
9.83237	0.3272	1.04505	1.21793	29	9.91868	0.1125	0.40796	1.30705
9.83307	0.3251	1.03489	1.22318	30	9.92068	0.0975	0.45750	1.30600
+9.83374	−0.3179	−1.02437	−1.22825	July 1	+9.92315	−0.0845	+0.50185	−1.30482
+9.83469	−0.3062	−1.01346	−1.23314	2	+9.92600	−0.0766	+0.54198	−1.30352

E = +0″.04 = +0ˢ.003

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hr.)	Log *A*.	Log *B*.	Log *C*.	Log *D*.	Solar Day. (Sid. Hr.)	Log *A*.	Log *B*.	Log *C*.
July 1	+9.92315	−0.0845	+0.50185	−1.30482	Aug. 16	+9.99504	−0.2033	+1.18005
2	9.92600	0.0766	0.54198	1.30352	17	9.99566	0.2141	1.18531
3	9.92898	0.0764	0.57860	1.30209	18	9.99605	0.2219	1.19089
4	9.93190	0.0840	0.61226	1.30054	19	9.99630	0.2261	1.19529
5	9.93448	0.0978	0.64338	1.29886	20	9.99654	0.2266	1.20002
h (19.0) 6	+9.93652	−0.1140	+0.67231	−1.29706	h (22.0) 21	+9.99685	−0.2233	+1.20458
7	9.93800	0.1287	0.69932	1.29512	22	9.99738	0.2169	1.20897
8	9.93902	0.1384	0.72464	1.29306	23	9.99822	0.2085	1.21319
9	9.93976	0.1412	0.74846	1.29087	24	9.99944	0.2002	1.21726
10	9.94053	0.1365	0.77092	1.28854	25	0.00102	0.1942	1.22116
11	+9.94154	−0.1259	+0.79217	−1.28608	26	+0.00283	−0.1925	+1.22491
12	9.94298	0.1116	0.81231	1.28349	27	0.00473	0.1965	1.22851
13	9.94487	0.0974	0.83146	1.28076	28	0.00652	0.2059	1.23196
14	9.94714	0.0870	0.84967	1.27789	29	0.00799	0.2187	1.23525
15	9.94962	0.0830	0.86705	1.27487	30	0.00904	0.2324	1.23840
16	+9.95209	−0.0857	+0.88364	−1.27172	31	+0.00963	−0.2436	+1.24141
17	9.95436	0.0947	0.89951	1.26842	Sept. 1	0.00992	0.2502	1.24428
18	9.95633	0.1077	0.91470	1.26497	2	0.01004	0.2510	1.24700
19	9.95792	0.1220	0.92926	1.26138	3	0.01026	0.2461	1.24958
20	9.95917	0.1357	0.94324	1.25763	4	0.01075	0.2367	1.25203
h 21	+9.96011	−0.1467	+0.95667	−1.25372	h (23.0) 5	+0.01162	−0.2253	+1.25434
(20.0) 22	9.96083	0.1542	0.96958	1.24966	6	0.01287	0.2149	1.25652
23	9.96142	0.1575	0.98200	1.24544	7	0.01438	0.2077	1.25857
24	9.96203	0.1563	0.99396	1.24106	8	0.01600	0.2055	1.26048
25	9.96278	0.1510	1.00548	1.23650	9	0.01755	0.2084	1.26225
26	+9.96382	−0.1425	+1.01658	−1.23178	10	+0.01888	−0.2154	+1.26390
27	9.96522	0.1324	1.02730	1.22688	11	0.01992	0.2245	1.26542
28	9.96704	0.1234	1.03764	1.22180	12	0.02064	0.2338	1.26681
29	9.96922	0.1181	1.04762	1.21654	13	0.02107	0.2417	1.26807
30	9.97165	0.1190	1.05726	1.21109	14	0.02128	0.2471	1.26920
31	+9.97406	−0.1270	+1.06658	−1.20545	15	+0.02133	−0.2492	+1.27020
Aug. 1	9.97625	0.1409	1.07558	1.19961	16	0.02135	0.2475	1.27108
2	9.97802	0.1580	1.08428	1.19357	17	0.02142	0.2424	1.27183
3	9.97932	0.1745	1.09270	1.18731	18	0.02167	0.2338	1.27245
4	9.98013	0.1873	1.10084	1.18085	19	0.02219	0.2228	1.27294
h 5	+9.98064	−0.1943	+1.10872	−1.17415	h (0.0) 20	+0.02304	−0.2110	+1.27331
(21.0) 6	9.98105	0.1946	1.11633	1.16723	21	0.02423	0.2004	1.27356
7	9.98162	0.1889	1.12370	1.16007	22	0.02571	0.1932	1.27367
8	9.98253	0.1791	1.13083	1.15266	23	0.02733	0.1912	1.27366
9	9.98386	0.1685	1.13773	1.14499	24	0.02890	0.1949	1.27352
10	+9.98555	−0.1600	+1.14440	−1.13706	25	+0.03025	−0.2028	+1.27325
11	9.98747	0.1562	1.15085	1.12886	26	0.03124	0.2126	1.27286
12	9.98944	0.1583	1.15710	1.12037	27	0.03181	0.2212	1.27234
13	9.99128	0.1659	1.16313	1.11158	28	0.03204	0.2258	1.27169
14	9.99286	0.1774	1.16897	1.10249	29	0.03209	0.2246	1.27091
15	+9.99412	−0.1905	+1.17461	−1.09307	30	+0.03218	−0.2170	+1.27000
16	+9.99504	−0.2033	+1.18005	−1.08331	Oct. 1	+0.03250	−0.2099	+1.26896

$E = +0''.04 = +0^s.003$

FOR WASHINGTON MEAN MIDNIGHT.

og A.	Log B.	Log C.	Log D.	Solar Day. (Sld. Hr.)	Log A.	Log B.	Log C.	Log D.
03250	−0.2039	+1.26896	+0.47758	Nov. 16	+0.07578	−9.5670	+1.03976	+1.22071
03316	0.1873	1.26778	0.52511	17	0.07765	9.5439	1.02892	1.22611
03423	0.1702	1.26648	0.56786	18	0.07941	9.5444	1.01765	1.23131
03560	0.1556	1.26504	0.60668	19	0.08095	9.5629	1.00594	1.23631
03715	0.1460	1.26347	0.64222	h (4.0) 20	0.08211	9.5860	0.99377	1.24113
03868	−0.1423	+1.26176	+0.67497	21	+0.08293	−9.6005	+0.98110	+1.24576
04005	0.1438	1.25991	0.70533	22	0.08349	9.5969	0.96790	1.25021
04115	0.1488	1.25793	0.73359	23	0.08395	9.5679	0.95415	1.25448
04196	0.1547	1.25580	0.76002	24	0.08451	9.5068	0.93981	1.25858
04248	0.1598	1.25354	0.78483	25	0.08534	9.4094	0.92483	1.26250
04278	−0.1622	+1.25112	+0.80819	26	+0.08652	−9.2688	+0.90917	+1.26626
04292	0.1610	1.24857	0.83025	27	0.08806	9.0785	0.89278	1.26986
04301	0.1552	1.24586	0.85113	28	0.08986	8.8357	0.87559	1.27329
04313	0.1448	1.24301	0.87094	29	0.09178	8.5705	0.85755	1.27656
04340	0.1300	1.24000	0.88977	30	0.09364	8.4200	0.83859	1.27967
04392	−0.1113	+1.23685	+0.90770	Dec. 1	+0.09532	−8.5079	+0.81860	+1.28262
04474	0.0904	1.23353	0.92481	2	0.09672	8.6739	0.79750	1.28542
04588	0.0695	1.23006	0.94115	3	0.09786	8.8089	0.77517	1.28807
.04734	0.0519	1.22642	0.95678	4	0.09875	8.8837	0.75148	1.29057
.04897	0.0404	1.22262	0.97175	5	0.09947	8.8998	0.72627	1.29292
.05063	−0.0367	+1.21865	+0.98610	h (5.0) 6	+0.10007	−8.8451	+0.69935	+1.29512
.05212	0.0402	1.21451	0.99987	7	0.10066	8.6712	0.67049	1.29718
.05330	0.0479	1.21020	1.01309	8	0.10132	−8.0334	0.63942	1.29909
.05410	0.0558	1.20571	1.02581	9	0.10214	+8.5515	0.60580	1.30086
.05457	0.0592	1.20103	1.03804	10	0.10321	8.9455	0.56919	1.30248
.05481	−0.0552	+1.19617	+1.04981	11	+0.10455	+9.1495	+0.52905	+1.30396
.05503	0.0416	1.19112	1.06114	12	0.10615	9.2725	0.48466	1.30530
.05542	0.0187	1.18588	1.07207	13	0.10799	9.3408	0.43504	1.30650
.05614	9.9884	1.18043	1.08260	14	0.10994	9.3653	0.37884	1.30756
.05725	9.9543	1.17478	1.09277	15	0.11183	9.3506	0.31410	1.30849
.05871	−9.9216	+1.16891	+1.10257	16	+0.11353	+9.2997	+0.23782	+1.30927
.06038	9.8952	1.16283	1.11203	17	0.11491	9.2196	0.14504	1.30991
.06213	9.8786	1.15652	1.12117	18	0.11597	9.1291	0.02671	1.31042
.06376	9.8725	1.14999	1.13000	19	0.11672	9.0660	9.86332	1.31079
0.06516	9.8743	1.14321	1.13852	20	0.11730	9.0734	9.59804	1.31102
0.06629	−9.8798	+1.13619	+1.14675	h (6.0) 21	+0.11789	+9.1569	+8.79619	+1.31112
0.06712	9.8849	1.12891	1.15470	22	0.11869	9.2728	−9.43348	1.31107
0.06772	9.8861	1.12136	1.16239	23	0.11977	9.3820	9.78184	1.31089
0.06817	9.8810	1.11355	1.16981	24	0.12118	9.4669	9.97253	1.31058
0.06853	9.8681	1.10545	1.17698	25	0.12286	9.5224	0.10450	1.31012
0.06892	−9.8460	+1.09705	+1.18391	26	+0.12469	+9.5483	−0.20546	+1.30953
0.06942	9.8142	1.08835	1.19060	27	0.12653	9.5479	0.28721	1.30880
0.07013	9.7722	1.07933	1.19706	28	0.12821	9.5240	0.35587	1.30792
0.07111	9.7215	1.06998	1.20329	29	0.12966	9.4817	0.41503	1.30691
0.07240	9.6654	1.06028	1.20931	30	0.13086	9.4278	0.46696	1.30576
0.07398	−9.6108	+1.05021	+1.21511	31	+0.13179	+9.3707	−0.51322	+1.30447
0.07578	−9.5670	+1.03976	+1.22071	32	+0.13252	+9.3232	−0.55491	+1.30304

E = +0″.04 = $+0^{s}.003$

FOR MEAN .

FOR MEAN MIDNIGHT.

Log g.	Log h.	i	Log i.
		″	
0.99722	1 28549	−6.83	−0.8344
1.00129	1 28487	6.91	0.8393
1.00557	1 28425	6.98	0.8440
1.00970	1.28365	7.06	0.8485
1.01314	1.28307	7.13	0.8528
1.01569	1 28249	−7.20	−0.8570
1.01726	1.28192	7.26	0.8610
1.01800	1.28137	7.32	0.8648
1.01831	1 28083	7.39	0.8684
1.01864	1 28031	7 44	0.8718
1.01932	1 27980	−7 50	−0.8751
1.02073	1 27931	7 56	0.8783
1.02282	1.27883	7.61	0.8813
1.02552	1.27837	7.66	0.8841
1.02850	1.27794	7 71	0.8868
1.03152	1.27752	−7.75	−0.8893
1.03431	1.27711	7.79	0.8917
1.03668	1.27674	7.83	0.8940
1.03853	1.27638	7.87	0.8961
1.03981	1.27603	7.91	0.8980
1.04058	1.27572	−7.94	−0.8998
1.04089	1.27542	7.97	0.9015
1.04091	1.27515	8.00	0.9030
1.04088	1.27489	8.02	0.9044
1.04105	1.27466	8.05	0.9057
1.04170	1.27445	−8.07	−0.9066
1.04309	1.27427	8.09	0.9078
1.04526	1.27411	8.10	0.9086
1.04812	1.27398	8 12	0.9093
1.05132	1.27387	8.13	0.9099
1.05451	1.27378	−8.14	−0.9104
1.05726	1.27372	8.14	0.9107
1.05929	1.27369	8.15	0.9109
1.06043	1 27368	8.15	0.9110
1.06084	1.27360	8.14	0.9109
1.06075	1.27373	−8.14	−0.9107
1 06064	1.27379	8.14	0.9104
1.06084	1.27387	8.13	0.9099
1.06159	1.27399	8.12	0.9093
1.06307	1.27412	8.10	0.9086
1.06511	1.27428	−8 09	−0.9077
1.06760	1.27446	8.07	0.9067
1.07017	1.27467	8.05	0.9056
1.07253	1.27489	8.02	0.9044
1.07461	1.27514	8.00	0.9030
1.07618	1.27541	−7.97	−0.9015
1.07727	1.27570	−7.94	−0.8999

FOR W MEAN .

FOR WASHINGTON MEAN MIDNIGHT.

	f	*f'*	*G*		*H*		Log *g*.	Log *h*.	*i*	Log *i*.
	In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	s	s	° ′	h m	° ′	h m			″	
59	+2.111	−0.009	351 35.7	23 26.4	211 5.4	14 4.4	1.14139	1.30048	−4.47	−0.6507
86	2.121	0.011	351 54.0	23 27.6	210 9.8	14 0.7	1.14256	1.30104	4.36	0.6394
14	2.130	0.010	352 14.0	23 28.9	209 14.4	13 57.0	1.14435	1.30158	4.24	0.6277
41	2.140	0.007	352 32.0	23 30.1	208 19.1	13 53.3	1.14671	1.30211	4.13	0.6155
68	2.150	−0.002	352 46.4	23 31.0	207 24.0	13 49.6	1.14949	1.30264	4.01	0.6029
96	+2.160	+0.004	352 56.1	23 31.7	206 29.0	13 45.9	1.15248	1.30314	−3.89	−0.5897
23	2.170	0.009	353 1.1	23 32.1	205 34.2	13 42.3	1.15536	1.30363	3.77	0.5760
50	2.180	0.012	353 2.3	23 32.2	204 39.5	13 38.6	1.15799	1.30412	3.65	0.5618
78	2.190	0.013	353 1.3	23 32.1	203 45.0	13 35.0	1.16026	1.30459	3.52	0.5469
05	2.200	0.012	352 59.6	23 32.0	202 50.6	13 31.4	1.16207	1.30504	3.40	0.5314
33	+2.210	+0.009	352 58.5	23 31.9	201 56.4	13 27.8	1.16348	1.30549	−3.28	−0.5152
60	2.220	+0.004	352 59.2	23 32.0	201 2.2	13 24.1	1.16458	1.30592	3.15	0.4983
87	2.231	−0.001	353 2.6	23 32.2	200 8.2	13 20.5	1.16541	1.30633	3.02	0.4805
.15	2.241	0.007	353 9.5	23 32.6	199 14.3	13 17.0	1.16622	1.30673	2.90	0.4619
.42	2.252	0.012	353 19.9	23 33.3	198 20.5	13 13.4	1.16714	1.30710	2.77	0.4423
.69	+2.262	−0.015	353 33.3	23 34.2	197 26.9	13 9.8	1.16831	1.30748	−2.64	−0.4217
197	2.273	0.016	353 48.8	23 35.3	196 33.4	13 6.2	1.16995	1.30783	2.51	0.3999
224	2.283	0.015	354 4.2	23 36.3	195 39.9	13 2.7	1.17215	1.30816	2.38	0.3768
252	2.294	0.010	354 17.7	23 37.2	194 46.6	12 59.1	1.17490	1.30848	2.25	0.3524
279	2.305	−0.003	354 27.3	23 37.7	193 53.3	12 55.5	1.17805	1.30879	2.12	0.3263
306	+2.316	+0.004	354 32.0	23 38.1	193 0.1	12 52.0	1.18135	1.30906	−1.99	−0.2984
334	2.326	0.010	354 31.5	23 38.0	192 7.0	12 48.5	1.18451	1.30932	1.86	0.2686
361	2.337	0.014	354 27.4	23 37.8	191 14.0	12 44.9	1.18726	1.30957	1.72	0.2365
388	2.348	0.014	354 21.7	23 37.4	190 21.1	12 41.4	1.18940	1.30980	1.59	0.2016
416	2.359	0.011	354 17.2	23 37.1	189 28.2	12 37.9	1.19090	1.31002	1.46	0.1635
443	+2.370	+0.006	354 16.2	23 37.1	188 35.3	12 34.4	1.19193	1.31021	−1.32	−0.1217
471	2.381	−0.001	354 20.1	23 37.3	187 42.5	12 30.8	1.19270	1.31038	1.19	0.0752
498	2.392	0.006	354 29.0	23 37.9	186 49.8	12 27.3	1.19358	1.31055	1.06	0.0231
525	2.403	0.010	354 41.7	23 38.8	185 57.1	12 23.8	1.19478	1.31068	0.92	9.9637
553	2.414	0.010	354 56.0	23 39.7	185 4.4	12 20.3	1.19652	1.31079	0.78	9.8947
580	+2.425	−0.008	355 9.3	23 40.6	184 11.8	12 16.8	1.19879	1.31090	−0.65	−9.8126
608	2.436	−0.003	355 19.6	23 41.3	183 19.2	12 13.3	1.20147	1.31098	0.51	9.7110
635	2.447	+0.002	355 25.8	23 41.7	182 26.6	12 9.8	1.20435	1.31105	0.38	9.5781
662	2.458	0.007	355 27.8	23 41.9	181 34.1	12 6.3	1.20721	1.31109	0.24	9.3854
.690	2.469	0.011	355 25.9	23 41.7	180 41.5	12 2.8	1.20983	1.31111	−0.11	−9.0303
717	+2.480	+0.013	355 22.1	23 41.5	179 49.0	11 59.3	1.21214	1.31112	+0.03	+8.4543
744	2.491	0.013	355 17.1	23 41.1	178 56.5	11 55.8	1.21402	1.31111	0.16	9.2152
772	2.502	0.010	355 12.5	23 40.8	178 3.9	11 52.3	1.21556	1.31107	0.30	9.4767
799	2.513	+0.006	355 9.2	23 40.6	177 11.4	11 48.8	1.21675	1.31102	0.44	9.6387
827	2.524	0.000	355 8.4	23 40.6	176 18.9	11 45.3	1.21772	1.31096	0.57	9.7563
854	+2.535	−0.006	355 10.4	23 40.7	175 26.3	11 41.8	1.21857	1.31086	+0.71	+9.8486
881	2,546	0.011	355 15.3	23 41.0	174 33.8	11 38.3	1.21945	1.31075	0.84	9.9246
909	2.557	0.015	355 22.9	23 41.5	173 41.2	11 34.7	1.22054	1.31062	0.98	9.9892
936	2.568	0.017	355 32.6	23 42.2	172 48.6	11 31.2	1.22200	1.31048	1.11	0.0452
963	2.579	0.016	355 42.8	23 42.9	171 55.9	11 27.7	1.22390	1.31032	1.24	0.0948
991	+2.590	−0.012	355 51.7	23 43.4	171 3.3	11 24.2	1.22629	1.31013	+1.38	+0.1391
018	+2.600	−0.006	355 57.8	23 43.9	170 10.6	11 20.7	1.22909	1.30994	+1.51	+0.1793

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sidereal Hour.)		τ	f	f′	G		H		Log g.	Log h.	ι
			In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.			
		y	s	s	° ′	h m	° ′	h m			″
July	1	0.4991	+2.590	−0.012	355 51.7	23 43.4	171 3.3	11 24.2	1.22629	1.31013	+1.38
	2	0.5018	2.600	−0.006	355 57.8	23 43.9	170 10.6	11 20.7	1.22909	1.30994	1.51
	3	0.5046	2.611	+0.001	355 59.6	23 44.0	169 17.8	11 17.2	1.23205	1.30971	1.64
	4	0.5073	2.622	0.007	355 57.0	23 43.8	168 24.9	11 13.7	1.23500	1.30948	1.78
h	5	0.5100	2.633	0.012	355 50.6	23 43.4	167 32.0	11 10.1	1.23763	1.30922	1.91
(19.0)	6	0.5128	+2.644	+0.014	355 42.4	23 42.8	166 39.1	11 6.6	1.23975	1.30896	+2.04
	7	0.5155	2.654	0.012	355 34.5	23 42.3	165 46.1	11 3.1	1.24131	1.30866	2.17
	8	0.5182	2.665	0.008	355 29.1	23 41.9	164 53.0	10 59.6	1.24238	1.30835	2.30
	9	0.5210	2.676	+0.002	355 27.9	23 41.9	163 59.8	10 56.0	1.24313	1.30804	2.43
	10	0.5237	2.686	−0.004	355 31.2	23 42.1	163 6.5	10 52.4	1.24387	1.30769	2.56
	11	0.5265	+2.697	−0.008	355 38.3	23 42.6	162 13.2	10 48.9	1.24481	1.30733	+2.69
	12	0.5292	2.707	0.010	355 47.6	23 43.2	161 19.7	10 45.3	1.24616	1.30697	2.82
	13	0.5319	2.717	0.008	355 56.7	23 43.8	160 26.1	10 41.7	1.24797	1.30659	2.94
	14	0.5347	2.728	−0.004	356 3.7	23 44.2	159 32.5	10 38.2	1.25017	1.30619	3.07
	15	0.5374	2.738	+0.001	356 7.3	23 44.5	158 38.7	10 34.6	1.25263	1.30577	3.19
	16	0.5402	+2.748	+0.006	356 7.1	23 44.5	157 44.8	10 31.0	1.25510	1.30533	+3.32
	17	0.5429	2.758	0.011	356 3.5	23 44.2	156 50.8	10 27.4	1.25740	1.30489	3.44
	18	0.5456	2.769	0.013	355 57.4	23 43.8	155 56.6	10 23.8	1.25943	1.30443	3.56
	19	0.5484	2.779	0.013	355 50.2	23 43.3	155 2.4	10 20.2	1.26108	1.30397	3.68
	20	0.5511	2.789	0.011	355 43.0	23 42.9	154 8.0	10 16.5	1.26239	1.30348	3.81
h	21	0.5538	+2.798	+0.007	355 37.0	23 42.5	153 13.5	10 12.9	1.26339	1.30298	+3.93
(20.0)	22	0.5566	2.808	+0.002	355 32.9	23 42.2	152 18.8	10 9.3	1.26415	1.30247	4.05
	23	0.5593	2.818	−0.004	355 31.2	23 42.1	151 24.0	10 5.6	1.26476	1.30195	4.16
	24	0.5621	2.828	0.009	355 32.3	23 42.2	150 29.1	10 1.9	1.26536	1.30142	4.28
	25	0.5648	2.837	0.014	355 36.0	23 42.4	149 34.0	9 58.3	1.26607	1.30088	4.39
	26	0.5675	+2.847	−0.017	355 41.7	23 42.8	148 38.8	9 54.6	1.26705	1.30034	+4.51
	27	0.5703	2.856	0.017	355 48.5	23 43.2	147 43.5	9 50.9	1.26840	1.29977	4.62
	28	0.5730	2.866	0.015	355 54.6	23 43.6	146 48.0	9 47.2	1.27015	1.29920	4.73
	29	0.5757	2.875	0.010	355 58.8	23 43.9	145 52.3	9 43.5	1.27230	1.29862	4.84
	30	0.5785	2.884	−0.003	355 59.6	23 44.0	144 56.5	9 39.8	1.27472	1.29803	4.95
	31	0.5812	+2.893	+0.004	355 56.5	23 43.8	144 0.5	9 36.0	1.27716	1.29745	+5.06
Aug.	1	0.5840	2.902	0.010	355 49.9	23 43.3	143 4.3	9 32.3	1.27942	1.29685	5.16
	2	0.5867	2.911	0.013	355 40.9	23 42.7	142 8.1	9 28.5	1.28126	1.29624	5.27
	3	0.5894	2.920	0.013	355 31.7	23 42.1	141 11.5	9 24.8	1.28265	1.29563	5.37
	4	0.5922	2.929	0.009	355 24.2	23 41.6	140 14.9	9 21.0	1.28354	1.29502	5.47
h	5	0.5949	+2.938	+0.004	355 20.1	23 41.3	139 18.0	9 17.2	1.28409	1.29440	+5.57
(21.0)	6	0.5976	2.946	−0.002	355 20.2	23 41.3	138 21.0	9 13.4	1.28450	1.29378	5.67
	7	0.6004	2.955	0.007	355 24.2	23 41.6	137 23.8	9 9.6	1.28503	1.29315	5.77
	8	0.6031	2.963	0.009	355 30.9	23 42.1	136 26.4	9 5.8	1.28588	1.29253	5.86
	9	0.6059	2.972	0.008	355 38.1	23 42.5	135 28.7	9 1.9	1.28713	1.29191	5.96
	10	0.6086	+2.980	−0.005	355 44.2	23 42.9	134 31.0	8 58.1	1.28877	1.29128	+6.05
	11	0.6113	2.988	0.000	355 47.5	23 43.2	133 33.0	8 54.2	1.29066	1.29065	6.14
	12	0.6141	2.996	+0.005	355 47.5	23 43.2	132 34.8	8 50.3	1.29263	1.29003	6.23
	13	0.6168	3.004	0.010	355 44.1	23 42.9	131 36.4	8 46.4	1.29450	1.28940	6.32
	14	0.6196	3.012	0.013	355 38.2	23 42.5	130 37.9	8 42.5	1.29613	1.28878	6.40
	15	0.6223	+3.020	+0.014	355 31.0	23 42.1	129 39.1	8 38.6	1.29746	1.28815	+6.48
	16	0.6250	+3.028	+0.013	355 23.6	23 41.6	128 40.2	8 34.7	1.29845	1.28753	+6.57

FOR MEAN MIDNIGHT.

	Log g.	Log h.	i	Log i.
1			″	
7	1.29845	1.28753	+6.57	+0.8173
7	1.29914	1.28692	6.65	0.8226
8	1.29959	1.28632	6.72	0.8277
8	1.29986	1.28572	6.80	0.8326
8	1.30011	1.28512	6.88	0.8373
8	1.30039	1.28454	+6.95	+0.8419
8	1.30087	1.28396	7.02	0.8462
8	1.30165	1.28339	7.09	0.8505
8	1.30281	1.28283	7.15	0.8545
8	1.30433	1.28228	7.22	0.8584
7	1.30613	1.28175	+7.28	+0.8622
6	1.30804	1.28122	7.34	0.8658
6	1.30988	1.28071	7.40	0.8692
5	1.31142	1.28020	7.46	0.8725
4	1.31255	1.27972	7.51	0.8757
3	1.31322	1.27925	+7.56	+0.8787
2	1.31355	1.27879	7.61	0.8816
0	1.31368	1.27835	7.66	0.8843
9	1.31386	1.27793	7.71	0.8869
8	1.31429	1.27752	7.75	0.8893
6	1.31507	1.27713	+7.79	+0.8916
4	1.31624	1.27676	7.83	0.8938
3	1.31770	1.27641	7.87	0.8958
1	1.31930	1.27608	7.90	0.8978
9	1.32086	1.27576	7.94	0.8995
7	1.32222	1.27547	+7.97	+0.9012
5	1.32331	1.27520	7.99	0.9027
2	1.32409	1.27495	8.02	0.9041
0	1.32456	1.27472	8.04	0.9053
8	1.32482	1.27451	8.06	0.9065
5	1.32488	1.27432	+8.08	+0.9075
3	1.32489	1.27417	8.10	0.9084
0	1.32492	1.27403	8.11	0.9091
8	1.32511	1.27391	8.12	0.9097
5	1.32556	1.27381	8.13	0.9102
3	1.32633	1.27375	+8.14	+0.9106
0	1.32745	1.27371	8.14	0.9108
7	1.32889	1.27368	8.14	0.9109
5	1.33049	1.27369	8.14	0.9109
2	1.33207	1.27371	8.14	0.9108
9	1.33346	1.27376	+8.14	+0.9105
6	1.33449	1.27383	8.13	0.9101
4	1.33511	1.27394	8.12	0.9096
1	1.33536	1.27406	8.11	0.90[illegible]0
8	1.33541	1.27421	8.10	0.9082
5	1.33545	1.27437	+8.08	+0.9073
3	1.33570	1.27456	+8.06	+0.9062

FOR MEAN MIDNIGHT.

Solar Day. (Sidereal Hour.)	
Oct.	1
	2
	3
	4
	5
h (1.0)	6
	7
	8
	9
	10
	11
	12
	13
	14
	15
	16
	17
	18
	19
	20
h (2.0)	21
	22
	23
	24
	25
	26
	27
	28
	29
	30
	31
Nov.	1
	2
	3
	4
h (3.0)	5
	6
	7
	8
	9
	10
	11
	12
	13
	14
	15
	16

FOR MEAN MIDNIGHT.

FOR WASHINGTON SIDEREAL TWELVE HOURS.

Mean Solar Date.		Log A_1.	Log B_1.	Log C.	Log D.	f	G_1	H	Log g_1.	Log h.
						s	° ′	° ′		
Jan.	0.72	+9.5166	−0.4382	−0.5332	+1.3038	+1.012	337 23	350 22	0.8534	1.3100
	10.69	9.5625	0.4415	0.8208	1.2823	1.125	339 19	340 56	0.8934	1.3068
	20.67	9.6017	0.4529	0.9828	1.2451	1.231	340 30	331 20	0.9294	1.3019
	30.64	9.6348	0.4689	1.0900	1.1894	1.328	341 12	321 30	0.9606	1.2958
Feb.	9.61	9.6627	0.4856	1.1644	1.1097	1.416	341 39	311 24	0.9874	1.2893
	19.58	+9.6860	−0.4998	−1.2159	+0.9953	+1.494	342 0	301 2	1.0098	1.2830
Mar.	1.56	9.7059	0.5086	1.2497	0.8209	1.564	342 26	290 26	1.0286	1.2779
	11.53	9.7232	0.5101	1.2684	+0.5006	1.627	343 1	279 41	1.0446	1.2746
	21.50	9.7391	0.5031	1.2736	−9.5615	1.688	343 50	268 53	1.0586	1.2737
	31.48	9.7545	0.4867	1.2658	0.5874	1.749	344 56	258 9	1.0717	1.2751
Apr.	10.45	+9.7702	−0.4609	−1.2447	−0.8594	+1.812	346 15	247 37	1.0848	1.2787
	20.42	9.7866	0.4257	1.2092	1.0160	1.882	347 44	237 21	1.0986	1.2839
	30.39	9.8040	0.3822	1.1570	1.1206	1.959	349 18	227 24	1.1136	1.2900
May	10.37	9.8226	0.3317	1.0835	1.1941	2.045	350 51	217 47	1.1302	1.2963
	20.34	9.8421	0.2771	0.9802	1.2460	2.138	352 16	208 28	1.1481	1.3020
	30.31	+9.8621	−0.2223	−0.8282	−1.2813	+2.239	353 29	199 25	1.1669	1.3067
June	9.28	9.8823	0.1727	0.5722	1.3024	2.346	354 26	190 33	1.1864	1.3097
	19.26	9.9021	0.1343	−9.8035	1.3109	2.455	355 8	181 47	1.2057	1.3111
	29.23	9.9211	0.1123	+0.3936	1.3073	2.565	355 34	173 3	1.2244	1.3105
July	9.20	9.9389	0.1087	0.7416	1.2915	2.672	355 47	164 16	1.2421	1.3081
	19.17	+9.9554	−0.1213	+0.9246	−1.2626	+2.775	355 49	155 20	1.2586	1.3041
	29.15	9.9702	0.1451	1.0442	1.2184	2.872	355 44	146 12	1.2734	1.2988
Aug.	8.12	9.9834	0.1734	1.1282	1.1555	2.959	355 35	136 48	1.2867	1.2928
	18.09	9.9950	0.2000	1.1884	1.0671	3.040	355 26	127 6	1.2984	1.2866
	28.07	0.0051	0.2202	1.2304	0.9393	3.112	355 19	117 6	1.3086	1.2809
Sept.	7.04	+0.0142	−0.2300	+1.2577	−0.7374	+3.177	355 19	106 48	1.3177	1.2766
	17.01	0.0224	0.2264	1.2714	−0.3131	3.238	355 26	96 17	1.3258	1.2741
	26.98	0.0302	0.2065	1.2726	+0.1547	3.297	355 43	85 39	1.3334	1.2739
Oct.	6.96	0.0380	0.1671	1.2609	0.6891	3.357	356 9	75 0	1.3410	1.2760
	16.93	0.0462	0.1044	1.2355	0.9152	3.421	356 44	64 26	1.3489	1.2802
	26.90	+0.0551	−0.0117	+1.1942	+1.0544	+3.491	357 25	54 4	1.3575	1.2859
Nov.	5.87	0.0648	9.8779	1.1335	1.1498	3.570	358 9	43 56	1.3670	1.2923
	15.85	0.0755	9.6790	1.0466	1.2171	3.658	358 51	34 2	1.3776	1.2987
	25.82	0.0870	−9.3388	0.9199	1.2637	3.757	359 29	24 22	1.3890	1.3043
Dec.	5.79	0.0991	+6.7782	0.7187	1.2936	3.863	0 0	14 54	1.4011	1.3084
	15.77	+0.1114	+9.2087	+0.2951	+1.3087	+3.974	0 21	5 32	1.4134	1.3107
	25.74	0.1237	9.4072	−0.1308	1.3100	4.088	0 33	356 13	1.4257	1.3109
	35.71	+0.1354	+9.4473	−0.6660	+1.2975	+4.200	0 35	346 51	1.4374	1.3090

E = +0s.003

The above numbers give the same reductions from mean to apparent place as are en in computing the apparent places of the fixed stars, given on pages 316 to 513, from th places, given on pages 217 to 230. In order to render exact interpolation possible through i *of ten days, all short period* terms have been omitted.

FOR W MEAN MIDNIGHT.

FOR W MEAN MIDNIGHT.

FOR JANUARY $0^d.217$, WASHINGTON MEAN TIME.

up. $5^m.5$, $6^m.2$, $0''.3$
p., var. irreg. $2^m.2$, $2^m.8$
p. comp. $7^m.5$, $4''$ s. pr.

β Phoenicis, dup. $4^m.1$, $4^m.1$, $1''$
ζ Piscium, star $6^m.5$, $24''$ n. f.

κ Tucanae, comp. 7^m, $6''$ n.
ϵ Sculptoris, comp. 9^m, $5''$ n. f.

FOR JANUARY $0^d.217$, WASHINGTON MEAN TIME.

o Ceti, var., 331^d, $1^m.7$–$9^m.6$ star 9^m f. 8^s
ι Cassiop., triple, 7^m, 8^m, $2''$, $8''$
γ Ceti, comp. $6^m.2$, $2''.7$ pr.

η Persei, star $8^m.5$, $28''$ n. pr.
ϵ Arietis, dup., $5^m.2$, $5^m.6$, $1''.2$
θ Eridani, comp. $4^m.4$, $8''$

ρ Persei, var. irreg., $3^m.4$-
β Persei, var. $2^d.87$, $2^m.1$-
12 Eridani, comp. 7^m, $1''.4$

FOR JANUARY 0ᵈ.217, MEAN TIME.

..., remarkable purplish red

..., comp. 9ᵐ, s. 7″

τ Tauri, quad., comps. 6ᵐ.3, 7ᵐ.6, 8ᵐ.2, 117″, 181″, 190″
9 H. Camelop., comp. 8ᵐ, 1″.9 n. f.
ε Persei, comp. 8ᵐ, 8″.6 n. f.

λ Tauri, var., 3ᵈ.95, 3ᵐ.2–4ᵐ.2
A Tauri, star 6ᵐ.5 f. 38ˢ, 270″ s.
m Persei, star 8ᵐ, 115″ s. pr.
ε Aurigæ, var. irreg., 3ᵐ.0–4ᵐ.5

FOR JANUARY $0^d.217$, WASHINGTON MEAN TIME.

β Orionis, comp. $8^m.0$, 9''.5 s. pr.
δ Orionis, star $6^m.9$, 52''.6 n.
ι Orionis, comp. $7^m.3$, 11''.5 s. f.

ζ Orionis, comp. $4^m.2$, 2''.4 s. f.
α Orionis red star, var. irreg. $1^m.0$–$1^m.4$
θ Aurigæ, comp. $7^m.5$, 2''.5 n. pr.

1 Puppis, star, $5^m.8$, 180''
η Gem., var. $231^d.4$, $3^m.2$–
$8^m.8$, 1''.2 n. pr.
8 Monoc., star, $6^m.5$, 12''.

FOR JANUARY $0^d.217$, WASHINGTON MEAN TIME.

, comp. $8^m.8$, 2''.9 s. pr.	γ^2 Volantis, comp. $5^m.8$, 12''.9 n. pr.	γ . pr.
, dup., $6^m.9$, $8^m.2$, 0''.7	δ Gem., comp. 8^m, 7''.0 s. pr.	ζ $5^m.6$, $6^m.3$, 1''
al., comp. 9^m, 7''.8 s. f.	σ Argus, star 8^m, 22''.4 n. f.	.4 s. f.
var., $10^d.15$, $3^m.7$–$4^m.3$	κ Gem., comp. $8^m.5$, 6''.0 s. pr.	

ons given for Sirius and Procyon are those of the centers of their orbits. Corrections given on page xii must *be applied to reduce to the positions of the stars.*

FOR JANUARY $0^d.217$, WASHINGTON MEAN TIME.

ι Cancri, star $6^m.0$, $30''.6$ n. pr.
ϵ Hydræ, triple: binary $3^m.5$, $6^m.9$, $0''.2$, with comp. $7^m.8$, $3''.3$
δ Argus, comp. 5^m, $2''$ s.

σ^2 Cancri, dup. $5^m.9$, $6^m.4$, $1''.4$
b^1 Carinæ, comp. $7^m.2$, $5^s.1$.
σ^2 Urs. Maj., binary $4^m.9$, 8^m, $1''.3$

ψ Argus, dup. $3^m.8$, $6^m.0$, 0
v Argus, comp. $6^m.0$, $4''.9$ s
γ Leonis, comp. $3^m.8$, $2''.7$

FOR JANUARY $0^d.217$, MEAN TIME.

var., irreg., $1^m.6$–$6^m.6$
comp. 7^m, $2''.3$ n. f.

δ Cham., star $5^m.5$ pr. 32^s, $256''$ n.
54 Leonis, comp. $6^m.3$, $6''.4$ s. f.

ι Leonis, comp. $6^m.8$, $2''.6$ n. f.
2 Can. Ven., star 8^m, $11''.6$ s. pr.

FOR JANUARY $0^d.217$, WASHINGTON MEAN TIME.

δ Corvi, star 8^m, $24''.4$ s. pr.
γ Crucis, star $6^m.0$, $85''$ n. f.
24 Comae, star $6^m.7$, $20''.6$ pr.
γ Cent., dup., $3^m.1$, $3^m.1$, $1''.7$

γ Virginis, binary, $3^m.7$, $3^m.7$, $6''.2$, $P=328^a$
α Can. Ven., star 5^m, $19''.8$ s. pr.
θ Virginis, comp. 9^m, $7''.1$ n. pr.

ζ[1] Urs. Maj., star Alcor 4^m, $228''$ n.
θ Apodis, var. irreg., 5^m.

FOR JANUARY 0d.217, WASHINGTON MEAN TIME.

ame of Star.	Magnitude.	Spectrum.	Right Ascension.	Annual Variation.	Annual P. M.	Declination.	Annual Variation.	Annual P. M.
			h m s	s	s	° ′ ″	″	″
inis	4.6	A2	14 14 36.912	+3.2411	−.0024	−12 59 22.71	−16.665	+0.021
e	6.3	K0	14 18 57.478	3.2240	−.0014	−11 20 7.90	16.539	−0.067
is	4.1	F8	14 22 22.329	2.0433	−.0254	+52 14 2.20	16.706	−0.406
is	5.4	A5	14 22 35.703	2.7901	−.0052	+19 35 58.11	16.274	+0.015
inis †	5.0	K0	14 23 55.458	+3.0691	−.0090	− 1 51 23.14	16.225	−0.004
Minoris	4.4	K2	14 27 40.979	−0.1604	+.0022	+76 3 54.14	−16.004	+0.021
is	3.8	K0	14 28 15.208	+2.5865	−.0073	+30 44 6.73	15.882	+0.113
is	3.0	F0	14 28 44.200	2.4171	−.0091	+38 40 14.90	15.825	+0.145
auri	2.6	B3p	14 30 13.824	3.7977	−.0032	−41 47 37.92	15.922	−0.082
is	4.5	F0	14 31 4.036	2.6131	+.0150	+30 6 18.60	15.721	+0.125
auri †	0.1	G0	14 33 57.052	+4.0561	−.4861	−60 29 36.71	−14.967	+0.723
is	5.4	A0	14 35 44.969	2.2341	−.0056	+44 45 43.53	15.635	−0.043
lis	3.8	K5	14 37 28.968	7.3038	−.0088	−78 41 37.47	15.520	−0.024
inis	4.0	F5	14 38 41.050	3.1588	+.0071	− 5 17 52.80	15.751	−0.322
is †	2.7	K0p	14 41 21.734	2.6203	−.0035	+27 25 24.57	15.269	+0.009
inis	3.8	A0	14 42 3.086	+3.0313	−.0074	+ 2 14 31.17	−15.274	−0.035
æ	5.3	F5	14 46 5.561	3.3136	−.0073	−15 39 10.04	15.061	−0.074
æ	2.9	A2	14 46 17.008	3.3141	−.0078	−15 41 51.20	15.073	−0.077
mbridge 2164	5.7	K2	14 49 19.924	+1.5204	−.0165	+59 37 51.22	14.701	+0.118
e Minoris	2.2	K5	14 50 56.060	−0.2026	−.0065	+74 29 40.81	14.721	+0.003
æ	5.6	K0	14 52 15.680	+3.2507	−.0006	−11 4 31.52	−14.646	−0.001
xi 221	5.8	A0	14 52 18.093	2.8298	−.0021	+14 46 51.83	14.653	−0.011
i	2.8	B2p	14 53 5.179	3.9139	−.0070	−42 48 2.05	14.658	−0.062
æ †	*var.*	A0	14 56 32.093	3.2015	−.0051	− 8 11 25.13	14.402	−0.015
tis	3.6	G5	14 58 49.182	2.2600	−.0036	+40 43 2.45	14.287	−0.040
pii	3.4	Ma	14 59 12.512	+3.5052	−.0056	−24 57 23.19	−14.271	−0.048
tis	4.7	K0	15 0 53.334	2.5704	−.0133	+27 16 14.23	14.133	−0.014
tis	5.0	F0	15 3 39.326	2.6347	+.0136	+25 11 30.10	14.131	−0.184
i	3.5	K0	15 6 18.818	4.2928	−.0126	−51 47 2.64	13.844	−0.066
æ	4.7	A0p	15 7 29.193	3.4145	−.0031	−19 28 42.58	13.757	−0.053
entis	5.4	K0	15 11 3.707	+2.9801	−.0017	+ 5 14 48.40	−13.478	−0.005
nguli Australis	3.1	A0	15 11 8.361	5.5554	−.0137	−68 22 27.17	13.510	−0.042
tis	3.5	K0	15 12 9.406	2.4193	+.0075	+33 37 25.59	13.528	−0.126
æ	2.7	B8	15 12 32.293	+3.2251	−.0066	− 9 4 38.73	13.402	−0.024
e Minoris	3.1	A2	15 20 51.060	−0.1143	−.0020	+72 7 45.49	12.815	+0.013
tis *pr.* †	4.5	F0	15 21 21.295	+2.2664	−.0121	+37 40 3.51	−12.713	+0.081
entis	5.5	Ma	15 21 56.323	2.7801	−.0024	+15 43 8.76	12.778	−0.024
conis	3.5	K0	15 23 4.993	1.3336	+.0014	+59 15 22.97	12.668	+0.010
æ	5.9	K0	15 23 34.354	3.3790	+.0006	−16 25 40.70	12.687	−0.043
næ Borealis	3.7	Fp	15 24 24.423	2.4738	−.0130	+29 23 28.09	12.509	+0.078
tis	5.2	K5	15 27 56.882	+2.1552	+.0016	+41 6 55.34	−12.359	−0.014
i (*mean*) †	3.0	B3	15 29 36.230	3.9375	−.0020	−40 53 20.03	12.279	−0.049
æ	4.0	K0	15 30 52.856	3.3526	+.0047	−14 30 48.31	12.135	+0.006
næ Borealis	2.3	A0	15 31 10.392	2.5395	+.0090	+26 59 35.81	12.221	−0.100
næ Borealis *seq.* †	5.1	B8	15 36 15.152	2.2596	−.0005	+36 54 16.73	11.776	−0.012
entis	2.8	K0	15 40 10.702	+2.9532	+.0089	+ 6 41 9.49	−11.442	+0.042
entis	3.7	A2	15 42 21.414	2.7686	+.0054	+15 40 50.67	11.383	−0.055
entis	4.3	K5	15 45 0.164	2.6996	−.0035	+18 23 49.35	11.236	−0.099
entis	3.6	A0	15 45 17.206	3.1286	−.0058	− 3 10 37.38	11.144	−0.028
Draconis	5.1	A2	15 45 23.868	0.9076	+.0047	+62 51 20.66	11.176	−0.068
entis	3.8	A0	15 46 40.625	+2.9885	+.0081	+ 4 43 36.86	−10.945	+0.070
e Minoris	4.3	A2	15 46 59.691	−2.1997	+.0082	+78 3 1.37	10.995	−0.004
nguli Australis	3.0	F0	15 47 49.006	+5.2589	−.0290	−63 10 32.92	11.339	−0.408
æ	5.1	B3	15 48 30.751	3.4777	−.0017	−19 55 12.01	10.926	−0.046
entis	3.9	F8	15 52 37.106	2.7698	+.0212	+15 55 54.25	11.865	−1.289
pii	3.0	B2p	15 53 49.642	+3.6241	−.0010	−25 52 34.10	−10.535	−0.048
næ Borealis	4.2	K0	15 54 9.009	+2.4824	−.0065	+27 7 2.90	−10.530	−0.067

s, comp. 9m, 4″.5 s. f.
comp. 5m.1, 2″.8 n. pr.

δ Libræ, var., 2d.33, 4m.8–6m.2
μ Boötis, star 6m.7, 108″ s.

γ Lupi, binary 3m.7, 3m.9, 0″.4
ζ Cor. Bor., comp. 6m.0, 6″.2 n. pr.

auri, dup., 0m.3, 1m.7; companion s. pr. The position given is that of the center of gravity of the system.
s given on page xii remain to be applied to reduce to the position of α² Centauri.

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β Scorpii, comp. $5^m.1$, 13″.3 n. f.
κ Herculis, star $6^m.5$, 29″.7 n. f.
σ *Cor. Bor., comp.* $6^m.7$, *4″.6 s. pr.*
σ *Scorpii, star* 8^m, *21″ pr.*
ν *Draconis, comp.* 8^m, *5″.4 s. f.*

α Scorpii, comp. 7^m, 3″.2 pr.
λ Ophiuchi, comp. 6^m, 1″.2 n. f.
ζ Herculis, binary, $3^m.0$, $6^m.0$, 1″
η Oph., binary, $3^m.2$, $3^m.7$, 0″.5

α Herculis, var. irreg., $3^m.1$-3
comp. 6^m, 4″.6 s. f.
δ Herculis, binary, comp.
s. pr.

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star $6^m.1$, 39''.4 n. f.
l, comp. 6^m, 2''.1 s.

β Lyræ, var., $12^d.9$, $3^m.4$–$4^m.1$, star 7^m, 46'' s. f.
o Draco, star $7^m.6$, 32''.1 n. pr.

θ Serpentis, star $5^m.4$, 22''.2 s. f.
R Lyræ, var., $46^d.4$, $4^m.0$–$4^m.7$.
ζ Sag., binary, $3^m.4$, $3^m.6$, 0''.4.

FOR JANUARY $0^d.217$, MEAN TIME.

β Cygni, star $5^m.4$, $34''.7$ n. f.
δ Cygni, comp. 8^m, $1''.6$ n. pr.
η Aquilæ, var., $7^d.18$, $3^m.7$–$4^m.4$
ϵ Draconis, comp. $7^m.6$, $3''.1$ n.

o Cygni, star $5^m.0$ pr. 19^s, $270''$ n., star $7^m.8$ f. 1^s, $96''$ s.
κ Cephei, comp. 8^m, $7''.5$ s. f.
α^2 Capricor., α^1 Capricor. $4^m.6$ pr. 24^s, $137''$ n.

β Capricor., star $6^m.2$ pr.
π Capricor., comp. 9^m, 3
ρ Capricor., comp. $7^m.6$,
β Delphini, binary $4^m.1$
γ Delphini, comp. $5^m.5$,

FOR JANUARY $0^d.217$, WASHINGTON MEAN TIME.

Name of Star.	Magnitude.	Spectrum.	Right Ascension.	Annual Variation.	Annual P. M.	Declination.	Annual Variation.	Annual P. M.
			h m s	s	s	° ′ ″	″	″
H¹. Draconis . .	5.6	K0	20 51 23.721	−2.6348	−.0105	+80 14 30.34	+13.607	−0.025
Cygni . . .	4.0	A0	20 54 4.689	+2.2356	+.0008	+40 50 49.17	13.786	−0.018
Octantis . . .	5.2	F2	20 54 42.416	7.3755	−.0007	−77 20 31.45	13.454	−0.389
Microscopii . .	4.7	G5	20 56 12.259	3.6861	−.0004	−32 34 58.56	13.933	−0.004
Capricorni . .	4.2	A0	21 1 17.001	3.3751	+.0051	−17 33 48.54	14.187	−0.066
Cygni . . .	3.9	K5	21 1 54.674	+2.1814	+.0009	+43 35 46.67	+14.300	+0.008
Cygni *pr.* . .	5.6	K5	21 3 10.466	2.6853	+.3496	+38 20 26.13	17.618	+3.249
Cygni *seq.* . .	6.3	K5	$\Delta\alpha$ + 1.499	. . . .	. . .	$\Delta\delta$ −15.64	. . . .	. . .
Aquarii . . .	4.5	K0	21 5 4.447	+3.2098	+.0057	−11 42 30.02	14.479	−0.006
Bradley 2777 . .	5.9	A	21 7 11.200	−1.1450	+.0102	+77 47 24.11	14.641	+0.029
Piscis Australis .	5.6	K5	21 8 22.207	+3.5630	+.0075	−27 57 30.84	+14.576	−0.106
Cygni . . .	3.4	K0	21 9 24.176	2.5522	−.0002	+29 53 9.03	14.683	−0.061
Cygni . . . †	3.8	F0	21 11 28.636	2.3941	+.0141	+37 41 26.11	15.300	+0.434
Equulei . . .	4.1	F8p	21 11 40.506	2.9992	+.0034	+ 4 54 14.60	14.792	−0.085
Cygni . . .	4.3	A0p	21 14 9.301	2.3549	−.0001	+39 2 47.12	15.025	+0.003
Microscopii . .	4.9	A2p	21 15 27.288	+3.8440	+.0028	−41 9 40.04	+15.102	+0.005
Cephei . . .	2.6	A5	21 16 36.023	1.4348	+.0224	+62 14 0.93	15.212	+0.050
Capricorni . .	4.3	K0	21 17 37.651	3.3438	+.0022	−17 11 19.32	15.225	+0.004
Pegasi . . .	4.2	K0	21 18 14.864	2.7741	+.0075	+19 26 55.70	15.321	+0.064
Pavonis . . .	4.3	F8	21 19 35.870	4.9983	+.0154	−65 44 34.26	16.117	+0.784
ζ Capricorni . .	3.9	G5p	21 21 55.893	+3.4300	+.0004	−22 46 17.40	+15.484	+0.020
Cygni . . . †	5.3	K0	21 26 23.141	2.2128	+.0060	+46 10 27.13	15.814	+0.105
Aquarii . . .	3.1	G0	21 27 11.442	3.1598	+.0012	− 5 56 13.11	15.742	−0.011
β Cephei . . . †	3.3	B1	21 27 35.732	0.7853	+.0026	+70 11 46.22	15.780	+0.005
ξ Aquarii . . .	4.8	A5	21 33 20.090	3.1955	+.0075	− 8 13 37.29	16.056	−0.023
74 Cygni . . .	5.1	A5	21 33 37.291	+2.4035	+.0003	+40 2 24.51	+16.103	+0.009
γ Capricorni . .	3.8	F0p	21 35 29.676	3.3270	+.0129	−17 2 15.90	16.174	−0.017
ε Pegasi . . .	2.5	K0	21 40 6.553	2.9461	+.0016	+ 9 29 37.98	16.425	0.000
11 Cephei . . .	4.8	K0	21 40 42.615	0.8874	+.0221	+70 55 44.50	16.549	+0.093
δ Capricorni . .	3.0	A5	21 42 27.698	3.3139	+.0176	−16 30 16.26	16.246	−0.297
π² Cygni . . .	4.3	B3	21 43 43.539	+2.2147	+.0009	+48 55 30.44	+16.604	−0.001
μ Capricorni . .	5.2	F0	21 48 46.341	3.2728	+.0204	−13 56 35.42	16.849	+0.001
γ Gruis . . .	3.2	B8	21 48 54.415	3.6406	+.0077	−37 45 21.18	16.634	−0.021
16 Pegasi . . .	5.0	B3	21 49 17.082	2.7285	+.0005	+25 32 3.21	16.878	+0.006
79 Draconis . .	6.6	A0	21 51 49.247	0.7179	+.0100	+73 18 33.99	17.007	+0.016
δ Indi . . .	4.7	K5	21 57 1.104	+4.6081	+.4783	−57 7 39.60	+14.655	−2.572
20 Pegasi . . .	5.7	F2	21 57 2.716	2.9222	+.0038	+12 43 18.54	17.176	−0.054
α Aquarii . . .	3.2	G0	22 1 31.295	3.0820	+.0010	− 0 43 24.62	17.424	−0.002
ι Aquarii . . .	4.4	B8	22 1 57.362	3.2423	+.0022	−14 16 22.40	17.383	−0.062
20 Cephei . . .	5.4	K5	22 2 29.121	1.8229	+.0032	+62 22 49.19	17.519	+0.051
α Gruis . . .	2.2	B5	22 3 0.476	+3.7928	+.0110	−47 21 49.43	+17.315	−0.174
ι Pegasi . . .	4.0	F5	22 3 8.777	2.7916	+.0222	+24 56 21.20	17.516	+0.020
θ Pegasi . . .	3.7	A0	22 6 0.805	3.0267	+.0187	+ 5 47 20.84	17.652	+0.036
π Pegasi . . .	4.4	F5	22 6 17.996	2.6628	−.0003	+32 46 13.86	17.610	−0.018
ζ Cephei . . .	3.6	K0	22 7 58.365	2.0783	+.0018	+57 47 30.65	17.708	+0.010
24 Cephei . . .	5.0	G5	22 8 12.885	+1.1573	+.0044	+71 55 55.62	+17.711	+0.004
θ Aquarii . . .	4.3	K0	22 12 27.295	3.1671	+.0074	− 8 11 49.13	17.860	−0.019
α Tucanæ . . .	2.9	K2	22 12 49.495	4.1332	−.0118	−60 40 25.05	17.859	−0.035
γ Aquarii . . .	4.0	A0	22 17 22.185	3.0990	+.0081	− 1 48 21.22	18.084	+0.015
31 Pegasi . . .	4.9	B3p	22 17 25.960	2.9530	+.0010	+11 47 11.51	18.078	+0.007
3 Lacertæ . . .	4.6	K0	22 20 17.636	+2.3559	−.0007	+51 48 46.37	+17.900	−0.188
π Aquarii . . .	4.6	B1	22 21 2.291	3.0637	+.0004	+ 0 57 20.70	18.204	−0.001
σ Aquarii . . .	4.9	A0	22 26 15.390	3.1769	.0000	−11 6 10.87	18.366	−0.026
α Lacertæ . . .	3.8	A0	22 27 52.200	2.4684	+.0157	+49 51 19.43	18.461	+0.014
υ Aquarii . . .	5.3	F5	22 30 9.299	3.2848	+.0148	−21 8 2.09	18.370	−0.154
26 B. Cephei . .	5.7	A0	22 30 49.232	+1.0041	−.0052	+75 47 55.01	+18.547	0.000

Cygni, comp. 7^m, 0″.3 | Cygni, star $6^m.7$ f. 10^s, 420″ s. | β Cephei, star 8^m, 13″.3 s. pr.

FOR JANUARY $0^d.217$, WASHINGTON MEAN TIME.

β Pegasi, var. irreg., $2^m.2$–$2^m.7$
π Cephei, comp. 7^m, $0''.9$ f.

ψ Aquarii, star $8^m.5$, $49''.4$ n. pr.
o Cephei, comp. 8^m, $2''.9$ s. pr.

72 Pegasi, binary, $6^m.0$, 6^m

FOR JANUARY $0^d.217$, WASHINGTON MEAN TIME.

, star 9^m, 18″ s. pr. | 32 H. Camelop., star 8^m, 19″.8 s. pr. | λ Octantis, binary, $5^m.6$, $8^m.0$, 3″.2 n. f.

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			α Ursæ Minoris. (*Polaris.*) Mag. 2.1			4 G. Octantis. Mag. 5.6			Groombridge 750. Mag. 6.7			Groombridg[e] Mag. [6…]	
Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m
Jan.	0 57	+85 49	Jan.	1 29	+88 52	Jan.	1 41	−85 11	Jan.	4 10	+85 20	Jan.	5 35
	s	″		s	″		s	″		s	″		s
0.3	10.94	12.49	0.3	89.73	10.50	0.3	67.69	34.01	0.4	20.66	27.91	0.5	34.29
1.3	10.68	12.55	1.3	88.81	10.59	1.3	67.40	34.06	1.4	20.55	28.15	1.5	34.17
2.3	10.44	12.60	2.3	87.93	10.69	2.3	67.09	34.11	2.4	20.45	28.38	2.4	34.16
3.3	10.21	12.66	3.3	87.07	10.80	3.3	66.77	34.16	3.4	20.36	28.62	3.4	34.15
4.3	9.97	12.75	4.3	86.20	10.92	4.3	66.49	34.15	4.4	20.27	28.88	4.4	34.15
5.3	9.71	12.81	5.3	85.28	11.03	5.3	66.19	34.12	5.4	20.17	29.15	5.4	34.15
6.2	9.44	12.88	6.3	84.28	11.16	6.3	65.91	34.08	6.4	20.07	29.44	6.4	34.15
7.2	9.16	12.95	7.3	83.23	11.29	7.3	65.63	34.03	7.4	19.95	29.74	7.4	34.12
8.2	8.85	13.01	8.3	82.12	11.40	8.3	65.38	33.99	8.4	19.81	30.03	8.4	34.08
9.2	8.53	13.06	9.3	80.97	11.51	9.3	65.13	33.94	9.4	19.66	30.31	9.4	34.03
10.2	8.20	13.08	10.3	79.80	11.57	10.3	64.88	33.91	10.4	19.49	30.59	10.4	33.97
11.2	7.90	13.09	11.3	78.62	11.63	11.3	64.63	33.88	11.4	19.31	30.84	11.4	33.88
12.2	7.59	13.06	12.3	77.45	11.68	12.3	64.37	33.85	12.4	19.12	31.08	12.4	33.78
13.2	7.28	13.02	13.2	76.31	11.69	13.3	64.11	33.84	13.4	18.92	31.29	13.4	33.67
14.2	6.99	12.97	14.2	75.22	11.70	14.3	63.83	33.84	14.4	18.73	31.49	14.4	33.56
15.2	6.72	12.92	15.2	74.19	11.69	15.3	63.54	33.83	15.4	18.54	31.68	15.4	33.45
16.2	6.47	12.88	16.2	73.22	11.69	16.2	63.25	33.79	16.4	18.38	31.86	16.4	33.36
17.2	6.23	12.85	17.2	72.29	11.70	17.2	62.93	33.72	17.3	18.23	32.03	17.4	33.27
18.2	5.99	12.83	18.2	71.39	11.73	18.2	62.63	33.64	18.3	18.08	32.21	18.4	33.20
19.2	5.75	12.83	19.2	70.46	11.78	19.2	62.32	33.53	19.3	17.94	32.43	19.4	33.14
20.2	5.49	12.82	20.2	69.49	11.83	20.2	62.03	33.38	20.3	17.80	32.65	20.4	33.09
21.2	5.22	12.83	21.2	68.44	11.89	21.2	61.76	33.23	21.3	17.63	32.88	21.4	33.01
22.2	4.94	12.81	22.2	67.31	11.94	22.2	61.52	33.09	22.3	17.46	33.11	22.4	32.93
23.2	4.61	12.77	23.2	66.12	11.96	23.2	61.27	32.94	23.3	17.27	33.35	23.4	32.83
24.2	4.29	12.72	24.2	64.91	11.94	24.2	61.03	32.81	24.3	17.04	33.56	24.4	32.69
25.2	3.97	12.62	25.2	63.71	11.90	25.2	60.80	32.69	25.3	16.81	33.75	25.4	32.54
26.2	3.68	12.50	26.2	62.55	11.84	26.2	60.54	32.59	26.3	16.57	33.91	26.4	32.36
27.2	3.40	12.36	27.2	61.47	11.75	27.2	60.27	32.50	27.3	16.33	34.05	27.4	32.18
28.2	3.15	12.23	28.2	60.46	11.67	28.2	59.99	32.39	28.3	16.10	34.16	28.4	32.03
29.2	2.91	12.10	29.2	59.52	11.58	29.2	59.69	32.26	29.3	15.89	34.27	29.4	31.88
30.2	2.69	11.99	30.2	58.64	11.53	30.2	59.40	32.14	30.3	15.70	34.38	30.4	31.73
31.2	2.48	11.89	31.2	57.76	11.47	31.2	59.10	32.00	31.3	15.51	34.50	31.4	31.60
13.72 +13.68			50.70 +50.69			11.93 −11.89			12.31 +12.27			11.86 +	
0^h 57^m $9^s.300$			1^h 30^m $13^s.156$			1^h 42^m $2^s.339$			4^h 10^m $2^s.561$			5^h 35^m	
+85° 48′ 45″.30			+88° 51′ 43″.55			−85° 11′ 21″.46			+85° 20′ 10″.34			+85° 9′	

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

Mensæ. g. 6.2		ζ Mensæ. Mag. 5.6			51 H. Cephei. Mag. 5.3			25 H. Camelop. Mag. 5.1			7 G. Octantis. Mag. 6.4		
ight scen-ion.	Decli-nation.	Wash. Mean Time.	Right Ascen-sion.	Decli-nation.	Wash. Mean Time.	Right Ascen-sion.	Decli-nation.	Wash. Mean Time.	Right Ascen-sion.	Decli-nation.	Wash. Mean Time.	Right Ascen-sion.	Decli-nation.
h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
5 46	−84 49	Jan.	6 47	−80 43	Jan.	7 2	+87 10	Jan.	7 13	+82 34	Jan.	7 16	−86 54
s	″		s	″		s	″		s	″		s	″
5.81	48.31	0.5	5.15	36.15	0.5	42.13	53.42	0.5	57.32	27.41	0.5	37.37	2.82
5.72	48.68	1.5	5.15	36.56	1.5	42.22	53.69	1.5	57.36	27.66	1.5	37.39	3.23
5.62	49.05	2.5	5.13	36.97	2.5	42.33	53.97	2.5	57.42	27.90	2.5	37.39	3.64
5.48	49.43	3.5	5.10	37.38	3.5	42.46	54.23	3.5	57.49	28.14	3.5	37.36	4.05
5.35	49.78	4.5	5.06	37.78	4.5	42.59	54.51	4.5	57.56	28.38	4.5	37.30	4.45
5.20	50.12	5.5	5.03	38.16	5.5	42.74	54.80	5.5	57.63	28.64	5.5	37.22	4.83
5.05	50.44	6.5	4.99	38.53	6.5	42.88	55.10	6.5	57.70	28.93	6.5	37.13	5.20
4.90	50.72	7.5	4.95	38.87	7.5	43.01	55.42	7.5	57.77	29.24	7.5	37.02	5.56
4.75	51.00	8.5	4.91	39.20	8.5	43.12	55.76	8.5	57.83	29.56	8.5	36.91	5.90
4.61	51.28	9.5	4.86	39.53	9.5	43.21	56.11	9.5	57.88	29.90	9.5	36.81	6.23
4.48	51.55	10.5	4.82	39.85	10.5	43.26	56.46	10.5	57.92	30.23	10.5	36.72	6.54
4.35	51.83	11.5	4.78	40.18	11.5	43.28	56.81	11.5	57.93	30.56	11.5	36.63	6.86
4.21	52.11	12.5	4.74	40.51	12.5	43.29	57.15	12.5	57.94	30.89	12.5	36.55	7.20
4.07	52.40	13.5	4.70	40.86	13.5	43.25	57.48	13.5	57.95	31.22	13.5	36.48	7.55
3.93	52.71	14.5	4.66	41.22	14.5	43.21	57.78	14.5	57.95	31.51	14.5	36.41	7.91
3.79	53.04	15.5	4.62	41.60	15.5	43.17	58.07	15.5	57.95	31.78	15.5	36.32	8.28
3.62	53.37	16.5	4.57	41.98	16.5	43.14	58.34	16.5	57.95	32.05	16.5	36.21	8.67
3.45	53.70	17.5	4.51	42.38	17.5	43.13	58.61	17.5	57.95	32.31	17.5	36.08	9.07
3.25	54.02	18.5	4.45	42.76	18.5	43.14	58.88	18.5	57.98	32.56	18.5	35.91	9.48
3.05	54.30	19.5	4.37	43.13	19.5	43.17	59.17	19.5	58.01	32.82	19.5	35.73	9.86
2.82	54.58	20.4	4.29	43.47	20.5	43.21	59.47	20.5	58.04	33.10	20.5	35.50	10.23
2.60	54.82	21.4	4.21	43.79	21.5	43.25	59.78	21.5	58.07	33.42	21.5	35.27	10.57
2.40	55.04	22.4	4.13	44.09	22.5	43.27	60.12	22.5	58.09	33.74	22.5	35.04	10.90
2.20	55.24	23.4	4.05	44.38	23.5	43.24	60.47	23.5	58.10	34.08	23.5	34.82	11.19
2.01	55.45	24.4	3.97	44.66	24.4	43.18	60.81	24.5	58.10	34.42	24.5	34.62	11.48
1.82	55.69	25.4	3.90	44.96	25.4	43.08	61.14	25.5	58.06	34.76	25.5	34.43	11.78
1.64	55.93	26.4	3.82	45.27	26.4	42.94	61.46	26.5	58.02	35.07	26.5	34.25	12.10
1.45	56.19	27.4	3.74	45.59	27.4	42.79	61.76	27.4	57.97	35.36	27.5	34.08	12.44
1.26	56.46	28.4	3.67	45.93	28.4	42.63	62.05	28.4	57.93	35.63	28.4	33.91	12.80
1.05	56.75	29.4	3.59	46.30	29.4	42.48	62.31	29.4	57.88	35.87	29.4	33.71	13.18
0.82	57.03	30.4	3.51	46.65	30.4	42.35	62.56	30.4	57.84	36.10	30.4	33.48	13.55
0.59	57.30	31.4	3.41	46.99	31.4	42.24	62.81	31.4	57.81	36.35	31.4	33.22	13.93
−11.05		6.21	−6.12		20.35	+20.32		7.74	+7.67		18.50	−18.48	
6^m $14^s.756$		6^h 46^m $58^s.546$			7^h 2^m $4^s.048$			7^h 13^m $42^s.294$			7^h 16^m $20^s.292$		
9′ 48″.89		−80° 43′ 38″.16			+87° 10′ 54″.74			+82° 34′ 30″.13			−86° 54′ 6″.70		

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			ζ Octantis. Mag. 5.4			1 H. Draconis. Mag. 4.6			ζ Chamaeleontis. Mag. 5.2			30 H. Cam Mag. 5.	
Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m
Jan.	8 17	+88 52	Jan.	9 9	−85 19	Jan.	9 25	+81 41	Jan.	9 36	−80 33	Jan.	10 21
	s	″		s	″		s	″		s	″		s
0.6	16.68	50.38	0.6	6.86	47.99	0.6	32.61	24.46	0.6	26.82	56.57	0.7	14.97
1.6	17.19	50.64	1.6	7.03	48.34	1.6	32.71	24.64	1.6	26.91	56.91	1.6	15.11
2.6	17.73	50.89	2.6	7.18	48.72	2.6	32.82	24.80	2.6	27.01	57.27	2.6	15.26
3.6	18.30	51.12	3.6	7.32	49.11	3.6	32.95	24.95	3.6	27.11	57.65	3.6	15.42
4.6	18.93	51.36	4.6	7.45	49.49	4.6	33.08	25.10	4.6	27.20	58.02	4.6	15.59
5.6	19.57	51.59	5.6	7.55	49.86	5.6	33.21	25.26	5.6	27.27	58.40	5.6	15.76
6.6	20.24	51.87	6.6	7.63	50.23	6.6	33.34	25.43	6.6	27.34	58.78	6.6	15.94
7.5	20.89	52.15	7.6	7.71	50.59	7.6	33.48	25.63	7.6	27.40	59.11	7.6	16.13
8.5	21.52	52.45	8.6	7.78	50.93	8.6	33.61	25.85	8.6	27.46	59.45	8.6	16.31
9.5	22.09	52.78	9.6	7.84	51.27	9.6	33.73	26.09	9.6	27.51	59.79	9.6	16.49
10.5	22.59	53.11	10.6	7.92	51.60	10.6	33.84	26.34	10.6	27.57	60.12	10.6	16.65
11.5	23.02	53.43	11.6	8.00	51.93	11.6	33.94	26.60	11.6	27.62	60.44	11.6	16.81
12.5	23.39	53.75	12.6	8.08	52.26	12.6	34.05	26.86	12.6	27.68	60.77	12.6	16.96
13.5	23.69	54.08	13.6	8.17	52.59	13.6	34.14	27.13	13.6	27.74	61.11	13.6	17.09
14.5	23.93	54.40	14.6	8.26	52.94	14.6	34.22	27.37	14.6	27.81	61.46	14.6	17.21
15.5	24.15	54.70	15.6	8.35	53.32	15.6	34.29	27.61	15.6	27.88	61.82	15.6	17.34
16.5	24.38	54.97	16.6	8.44	53.72	16.6	34.37	27.84	16.6	27.95	62.19	16.6	17.45
17.5	24.64	55.24	17.6	8.53	54.13	17.6	34.45	28.04	17.6	28.01	62.60	17.6	17.57
18.5	24.94	55.47	18.6	8.58	54.55	18.6	34.53	28.24	18.6	28.07	63.02	18.6	17.70
19.5	25.31	55.73	19.6	8.62	54.97	19.6	34.63	28.46	19.6	28.12	63.45	19.6	17.83
20.5	25.72	56.00	20.5	8.63	55.41	20.6	34.73	28.68	20.6	28.16	63.88	20.6	17.98
21.5	26.14	56.31	21.5	8.64	55.82	21.6	34.84	28.90	21.6	28.19	64.29	21.6	18.14
22.5	26.54	56.65	22.5	8.63	56.19	22.6	34.95	29.16	22.6	28.21	64.66	22.6	18.30
23.5	26.85	56.99	23.5	8.61	56.54	23.6	35.06	29.45	23.6	28.23	65.04	23.6	18.45
24.5	27.09	57.34	24.5	8.61	56.88	24.6	35.14	29.76	24.6	28.25	65.38	24.6	18.59
25.5	27.21	57.71	25.5	8.62	57.23	25.5	35.20	30.09	25.6	28.27	65.72	25.6	18.71
26.5	27.22	58.04	26.5	8.64	57.58	26.5	35.26	30.38	26.6	28.30	66.08	26.6	18.81
27.5	27.18	58.36	27.5	8.67	57.95	27.5	35.30	30.67	27.5	28.33	66.45	27.6	18.90
28.5	27.10	58.66	28.5	8.70	58.34	28.5	35.33	30.95	28.5	28.37	66.84	28.6	18.98
29.5	27.04	58.94	29.5	8.73	58.75	29.5	35.37	31.21	29.5	28.41	67.25	29.6	19.05
30.5	27.00	59.21	30.5	8.74	59.17	30.5	35.42	31.45	30.5	28.45	67.67	30.6	19.13
31.5	27.01	59.48	31.5	8.74	59.61	31.5	35.46	31.70	31.5	28.47	68.11	31.6	19.22
	51.25	+51.24		12.29	−12.25		6.92	+6.85		6.10	−6.02		8.18
	$8^h\ 15^m\ 48^s.380$			$9^h\ 8^m\ 57^s.938$			$9^h\ 25^m\ 21^s.719$			$9^h\ 36^m\ 22^s.347$			$10^h\ 21^m$
		+88° 53′ 0″.29			−85° 19′ 57″.45			+81° 41′ 41″.50			−80° 34′ 6″.83		+82° 58′

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

...tantis. ...g. 6.3		Bradley 1678. Mag. 6.3			ι Octantis. Mag. 5.4			32 H. Camelop. *seq.* Mag. 5.3			κ Octantis. Mag. 5.6		
...ght Ascen-...n.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
59	−84 8	Jan.	12 14	+88 9	Jan.	12 46	−84 40	Jan.	12 48	+83 51	Jan.	13 27	+85 21
s	″		s	″		s	″		s	″		s	″
.98	37.88	0.7	38.79	9.03	0.8	6.64	9.16	0.8	31.72	23.04	0.8	11.96	29.57
.20	38.10	1.7	39.39	9.04	1.8	6.93	9.21	1.8	31.91	22.99	1.8	12.29	29.57
.42	38.34	2.7	39.98	9.03	2.7	7.23	9.30	2.7	32.09	22.90	2.8	12.62	29.59
.62	38.62	3.7	40.58	8.99	3.7	7.52	9.38	3.7	32.28	22.82	3.8	12.97	29.63
.83	38.91	4.7	41.21	8.96	4.7	7.81	9.51	4.7	32.47	22.74	4.8	13.31	29.69
.02	39.20	5.7	41.86	8.92	5.7	8.09	9.66	5.7	32.67	22.64	5.8	13.64	29.77
.21	39.49	6.7	42.57	8.88	6.7	8.34	9.80	6.7	32.90	22.54	6.8	13.96	29.85
.37	39.77	7.7	43.30	8.87	7.7	8.60	9.96	7.7	33.13	22.48	7.8	14.25	29.95
.51	40.05	8.7	44.05	8.87	8.7	8.84	10.11	8.7	33.36	22.42	8.8	14.53	30.04
.67	40.33	9.7	44.80	8.88	9.7	9.06	10.27	9.7	33.59	22.37	9.8	14.81	30.12
.82	40.59	10.7	45.54	8.92	10.7	9.29	10.41	10.7	33.82	22.34	10.8	15.08	30.19
.97	40.84	11.7	46.26	8.99	11.7	9.51	10.52	11.7	34.05	22.35	11.8	15.35	30.25
.13	41.09	12.7	46.97	9.07	12.7	9.75	10.64	12.7	34.27	22.36	12.7	15.63	30.31
.29	41.35	13.7	47.64	9.15	13.7	9.99	10.77	13.7	34.47	22.39	13.7	15.92	30.36
.47	41.61	14.7	48.26	9.24	14.7	10.24	10.90	14.7	34.67	22.43	14.7	16.22	30.42
.65	41.90	15.7	48.86	9.32	15.7	10.50	11.04	15.7	34.87	22.46	15.7	16.53	30.50
.82	42.21	16.7	49.42	9.40	16.7	10.78	11.21	16.7	35.05	22.49	16.7	16.86	30.59
.01	42.53	17.7	49.98	9.47	17.7	11.06	11.39	17.7	35.23	22.51	17.7	17.21	30.71
.19	42.89	18.7	50.55	9.53	18.7	11.34	11.61	18.7	35.42	22.51	18.7	17.55	30.85
.33	43.25	19.7	51.16	9.58	19.7	11.61	11.83	19.7	35.61	22.51	19.7	17.88	31.02
.48	43.61	20.7	51.81	9.61	20.7	11.87	12.07	20.7	35.83	22.50	20.7	18.20	31.20
.61	43.99	21.7	52.50	9.66	21.7	12.10	12.34	21.7	36.06	22.49	21.7	18.50	31.41
.71	44.36	22.7	53.21	9.74	22.7	12.31	12.59	22.7	36.28	22.51	22.7	18.77	31.61
.81	44.69	23.7	53.93	9.83	23.7	12.51	12.82	23.7	36.51	22.55	23.7	19.04	31.79
.91	45.01	24.7	54.65	9.97	24.7	12.71	13.04	24.7	36.74	22.60	24.7	19.28	31.94
.02	45.30	25.7	55.31	10.11	25.7	12.91	13.24	25.7	36.95	22.70	25.7	19.55	32.09
.15	45.61	26.7	55.92	10.29	26.7	13.13	13.43	26.7	37.15	22.80	26.7	19.82	32.23
.28	45.93	27.7	56.48	10.47	27.7	13.36	13.62	27.7	37.34	22.93	27.7	20.10	32.37
.43	46.27	28.7	56.99	10.64	28.7	13.61	13.83	28.7	37.52	23.06	28.7	20.41	32.52
.57	46.62	29.7	57.47	10.79	29.7	13.86	14.06	29.7	37.68	23.17	29.7	20.73	32.69
.71	46.99	30.6	57.97	10.93	30.7	14.11	14.32	30.7	37.85	23.28	30.7	21.05	32.88
.84	47.38	31.6	58.47	11.07	31.7	14.36	14.59	31.7	38.02	23.37	31.7	21.37	33.09
	−9.75		31.02	+31.00		10.76	−10.72		9.34	+9.29		12.36	−12.32
^{m}	$55^{s}.280$	12^{h}	14^{m}	$28^{s}.425$	12^{h}	46^{m}	$7^{s}.152$	12^{h}	48^{m}	$30^{s}.418$	13^{h}	27^{m}	$14^{s}.624$
′	50″.60	+88°	9′	36″.08	−84°	40′	22″.34	+83°	51′	50″.47	−85°	21′	42″.23

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Octantis. Mag. 4.1			Groombridge 2283. Mag. 7.2			ρ Octantis. Mag. 5.7			ε Ursæ Minoris. Mag. 4.4			59 G. Ap[illegible] Mag. 5[illegible]	
Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m
Jan.	14 13	−83 17	Jan.	15 3	+87 32	Jan.	15 23	−84 11	Jan.	16 54	+82 10	Jan.	17 15
	s	″		s	″		s	″		s	″		s
0.8	24.85	9.66	0.9	19.12	47.42	0.9	50.93	21.57	0.9	14.86	19.09	0.9	50.36
1.8	25.07	9.57	1.8	19.46	47.20	1.9	51.15	21.38	1.9	14.92	18.78	1.9	50.47
2.8	25.30	9.51	2.8	19.78	46.99	2.9	51.39	21.19	2.9	14.97	18.49	2.9	50.59
3.8	25.54	9.47	3.8	20.09	46.76	3.9	51.64	21.03	3.9	15.02	18.18	3.9	50.69
4.8	25.78	9.44	4.8	20.42	46.54	4.9	51.89	20.89	4.9	15.06	17.88	4.9	50.82
5.8	26.02	9.45	5.8	20.76	46.30	5.8	52.15	20.78	5.9	15.12	17.56	5.9	50.95
6.8	26.25	9.48	6.8	21.13	46.06	6.8	52.39	20.70	6.9	15.18	17.22	6.9	51.07
7.8	26.46	9.51	7.8	21.54	45.80	7.8	52.64	20.62	7.9	15.26	16.87	7.9	51.19
8.8	26.66	9.52	8.8	21.98	45.56	8.8	52.86	20.55	8.9	15.34	16.53	8.9	51.30
9.8	26.87	9.54	9.8	22.43	45.35	9.8	53.09	20.46	9.9	15.43	16.20	9.9	51.40
10.8	27.06	9.56	10.8	22.90	45.15	10.8	53.29	20.37	10.9	15.52	15.87	10.9	51.51
11.8	27.25	9.57	11.8	23.38	44.96	11.8	53.50	20.28	11.9	15.61	15.55	11.9	51.60
12.8	27.45	9.57	12.8	23.86	44.79	12.8	53.72	20.19	12.9	15.69	15.25	12.9	51.70
13.8	27.65	9.57	13.8	24.33	44.65	13.8	53.95	20.07	13.9	15.81	14.96	13.9	51.80
14.8	27.87	9.56	14.8	24.77	44.51	14.8	54.17	19.95	14.9	15.91	14.70	14.9	51.91
15.8	28.09	9.57	15.8	25.20	44.38	15.8	54.41	19.83	15.9	16.01	14.46	15.9	52.02
16.8	28.32	9.57	16.8	25.62	44.26	16.8	54.68	19.73	16.9	16.10	14.22	16.9	52.15
17.8	28.57	9.61	17.8	26.00	44.13	17.8	54.95	19.64	17.9	16.19	13.98	17.9	52.29
18.8	28.82	9.68	18.8	26.39	43.99	18.8	55.23	19.58	18.9	16.28	13.72	18.9	52.44
19.8	29.07	9.77	19.8	26.79	43.81	19.8	55.52	19.54	19.9	16.37	13.44	19.9	52.60
20.8	29.31	9.88	20.8	27.21	43.63	20.8	55.81	19.53	20.9	16.45	13.16	20.9	52.76
21.8	29.54	10.02	21.8	27.66	43.46	21.8	56.09	19.54	21.9	16.55	12.86	21.9	52.93
22.8	29.75	10.16	22.8	28.16	43.28	22.8	56.34	19.56	22.9	16.66	12.55	22.9	53.07
23.8	29.95	10.28	23.8	28.67	43.13	23.8	56.58	19.57	23.9	16.78	12.26	23.9	53.21
24.7	30.14	10.38	24.8	29.21	43.00	24.8	56.81	19.58	24.9	16.91	11.97	24.9	53.34
25.7	30.33	10.46	25.8	29.74	42.90	25.8	57.04	19.55	25.9	17.04	11.72	25.9	53.46
26.7	30.53	10.55	26.8	30.26	42.84	26.8	57.27	19.52	26.9	17.17	11.49	26.9	53.58
27.7	30.75	10.62	27.8	30.76	42.78	27.8	57.51	19.47	27.9	17.31	11.29	27.9	53.71
28.7	30.97	10.69	28.8	31.23	42.74	28.8	57.77	19.43	28.8	17.43	11.11	28.9	53.84
29.7	31.20	10.77	29.8	31.68	42.70	29.8	58.04	19.39	29.8	17.56	10.93	29.9	53.99
30.7	31.45	10.88	30.8	32.10	42.65	30.8	58.32	19.38	30.8	17.67	10.75	30.9	54.16
31.7	31.69	11.01	31.8	32.53	42.60	31.8	58.62	19.39	31.8	17.79	10.57	31.9	54.32
8.55		−8.49	23.35		+23.33	9.88		−9.83	7.34		+7.27	6.24	
14^h	13^m	$27^s.793$	15^h	3^m	$41^s.175$	15^h	23^m	$56^s.594$	16^h	54^m	$25^s.488$	17^h	15^m
−83°	17′	21″.03	+87°	33′	10″.52	−84°	11′	30″.39	+82°	10′	32″.75	−80°	47′

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

[illegible] Ursæ Minoris. Mag. 4.4			χ Octantis. Mag. 5.2			λ Ursæ Minoris. Mag. 6.6			σ Octantis. Mag. 5.5			76 Draconis. Mag. 5.7		
[illegible]	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
[illegible]	17 58	+86 36	Jan.	18 5	−87 39	Jan.	19 0	+89 0	Jan.	19 26	−89 13	Jan.	20 48	+82 13
	s	″		s	″		s	″		s	″		s	″
[illegible]	32.24	44.64	0.9	50.69	51.56	1.0	54.17	63.20	1.0	39.88	32.96	1.1	29.69	42.76
[illegible]	32.28	44.34	1.9	50.91	51.18	2.0	53.94	62.90	2.0	39.81	32.57	2.1	29.61	42.52
[illegible]	32.30	44.06	2.9	51.16	50.79	3.0	53.66	62.61	3.0	39.86	32.16	3.1	29.53	42.30
[illegible]	32.30	43.77	3.9	51.44	50.43	4.0	53.34	62.34	4.0	40.03	31.76	4.1	29.45	42.07
[illegible]	32.31	43.45	4.9	51.75	50.09	5.0	52.99	62.04	5.0	40.33	31.38	5.1	29.36	41.83
[illegible]	32.32	43.13	5.9	52.09	49.77	5.9	52.64	61.72	6.0	40.69	31.01	6.1	29.27	41.59
[illegible]	32.33	42.79	6.9	52.43	49.47	6.9	52.31	61.41	7.0	41.09	30.65	7.1	29.18	41.31
[illegible]	32.37	42.45	7.9	52.76	49.19	7.9	52.03	61.07	8.0	41.50	30.31	8.1	29.07	41.03
[illegible]	32.42	42.08	8.9	53.06	48.91	8.9	51.81	60.71	9.0	41.90	29.99	9.1	28.98	40.72
[illegible]	32.51	41.71	9.9	53.38	48.65	9.9	51.65	60.35	10.0	42.28	29.68	10.1	28.90	40.41
[illegible]	32.59	41.36	10.9	53.67	48.37	10.9	51.58	59.99	11.0	42.61	29.35	11.1	28.81	40.09
[illegible]	32.70	41.01	11.9	53.95	48.09	11.9	51.59	59.64	12.0	42.89	29.02	12.1	28.75	39.76
[illegible]	32.83	40.68	12.9	54.23	47.81	12.9	51.66	59.29	12.9	43.15	28.68	13.1	28.68	39.42
[illegible]	32.96	40.35	13.9	54.50	47.50	13.9	51.77	58.95	13.9	43.41	28.34	14.1	28.63	39.09
[illegible]	33.10	40.07	14.9	54.79	47.19	14.9	51.93	58.65	14.9	43.68	27.98	15.0	28.58	38.79
[illegible]	33.24	39.79	15.9	55.11	46.87	15.9	52.07	58.36	15.9	44.01	27.60	16.0	28.54	38.51
[illegible]	33.37	39.52	16.9	55.47	46.54	16.9	52.18	58.08	16.9	44.44	27.22	17.0	28.50	38.24
[illegible]	33.47	39.26	17.9	55.88	46.20	17.9	52.25	57.80	17.9	45.00	26.81	18.0	28.46	38.00
[illegible]	33.57	38.98	18.9	56.33	45.89	18.9	52.27	57.52	18.9	45.70	26.42	19.0	28.42	37.73
[illegible]	33.67	38.68	19.9	56.81	45.60	19.9	52.24	57.24	19.9	46.53	26.04	20.0	28.36	37.46
[illegible]	33.76	38.37	20.9	57.32	45.32	20.9	52.18	56.92	20.9	47.46	25.70	21.0	28.30	37.16
[illegible]	33.86	38.04	21.9	57.81	45.08	21.9	52.17	56.58	21.9	48.40	25.36	22.0	28.24	36.84
[illegible]	34.00	37.70	22.9	58.28	44.85	22.9	52.25	56.21	22.9	49.33	25.04	23.0	28.18	36.50
[illegible]	34.16	37.36	23.9	58.72	44.63	23.9	52.40	55.85	23.9	50.17	24.75	24.0	28.13	36.15
[illegible]	34.35	37.02	24.9	59.14	44.42	24.9	52.66	55.49	24.9	50.93	24.46	25.0	28.09	35.79
[illegible]	34.57	36.72	25.9	59.52	44.18	25.9	53.04	55.15	25.9	51.59	24.14	26.0	28.06	35.44
[illegible]	34.79	36.43	26.9	59.90	43.90	26.9	53.49	54.83	26.9	52.21	23.81	27.0	28.04	35.09
[illegible]	35.01	36.19	27.9	60.30	43.62	27.9	53.97	54.54	27.9	52.84	23.45	28.0	28.04	34.75
[illegible]	35.24	35.95	28.9	60.72	43.33	28.9	54.45	54.26	28.9	53.54	23.09	29.0	28.04	34.45
[illegible]	35.44	35.72	29.9	61.19	43.04	29.9	54.88	54.01	29.9	54.33	22.72	30.0	28.04	34.17
[illegible]	35.64	35.49	30.9	61.69	42.76	30.9	55.27	53.77	30.9	55.24	22.35	31.0	28.04	33.91
[illegible]	35.82	35.26	31.9	62.23	42.49	31.9	55.64	53.50	31.9	56.28	21.99	32.0	28.03	33.63
16.92		+16.89	24.52		−24.50	58.24		+58.23	73.87		−73.86	7.39		+7.33
17^h	59^m	$1^s.307$	18^h	6^m	$11^s.893$	19^h	2^m	$39^s.624$	19^h	27^m	$42^s.218$	20^h	48^m	$40^s.494$
+86°	36′	51″.17	−87°	39′	51″.82	+89°	1′	2″.17	−89°	13′	28″.57	+82°	13′	29″.86

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

λ Octantis. Mag. 5.4			υ Octantis. Mag. 5.7			β Octantis. Mag. 4.3			39 H. Cephei. Mag. 5.6			γ^1 Oct Mag.	
Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m
Jan.	21 38	−83 6	Jan.	22 15	−86 23	Jan.	22 37	−81 49	Jan.	23 27	+86 51	Jan.	23 47
	s	″		s	″		s	″		s	″		s
1.1	15.83	17.67	1.1	62.64	39.06	1.2	37.43	14.78	1.2	32.94	24.28	1.2	16.63
2.1	15.72	17.36	2.1	62.36	38.78	2.2	37.30	14.53	2.2	32.61	24.23	2.2	16.44
3.1	15.61	17.03	3.1	62.09	38.46	3.2	37.18	14.27	3.2	32.29	24.19	3.2	16.29
4.1	15.52	16.69	4.1	61.86	38.15	4.2	37.08	14.00	4.2	31.95	24.15	4.2	16.14
5.1	15.45	16.36	5.1	61.64	37.83	5.2	36.97	13.72	5.2	31.59	24.11	5.2	15.98
6.1	15.39	16.02	6.1	61.44	37.52	6.1	36.87	13.44	6.2	31.22	24.06	6.2	15.84
7.1	15.33	15.70	7.1	61.26	37.22	7.1	36.79	13.17	7.2	30.83	24.01	7.2	15.71
8.1	15.28	15.40	8.1	61.10	36.93	8.1	36.72	12.91	8.2	30.42	23.94	8.2	15.58
9.1	15.23	15.11	9.1	60.94	36.65	9.1	36.64	12.65	9.2	30.01	23.85	9.2	15.46
10.1	15.17	14.82	10.1	60.77	36.37	10.1	36.56	12.41	10.2	29.60	23.73	10.2	15.33
11.1	15.11	14.53	11.1	60.60	36.10	11.1	36.48	12.17	11.2	29.20	23.60	11.2	15.21
12.1	15.05	14.24	12.1	60.43	35.83	12.1	36.39	11.93	12.2	28.82	23.45	12.2	15.09
13.1	14.97	13.95	13.1	60.24	35.55	13.1	36.30	11.69	13.2	28.45	23.28	13.2	14.94
14.1	14.90	13.64	14.1	60.03	35.26	14.1	36.19	11.42	14.2	28.12	23.11	14.2	14.79
15.1	14.82	13.33	15.1	59.82	34.95	15.1	36.09	11.16	15.2	27.79	22.96	15.2	14.64
16.1	14.74	13.00	16.1	59.61	34.64	16.1	35.99	10.87	16.2	27.51	22.81	16.2	14.48
17.1	14.68	12.63	17.1	59.40	34.31	17.1	35.88	10.56	17.2	27.22	22.67	17.2	14.33
18.1	14.62	12.26	18.1	59.22	33.94	18.1	35.79	10.24	18.2	26.93	22.57	18.2	14.19
19.1	14.59	11.87	19.1	59.07	33.56	19.1	35.73	9.90	19.1	26.63	22.46	19.2	14.05
20.1	14.57	11.47	20.1	58.95	33.19	20.1	35.66	9.53	20.1	26.31	22.33	20.2	13.92
21.1	14.56	11.09	21.1	58.86	32.80	21.1	35.61	9.16	21.1	25.98	22.21	21.2	13.83
22.1	14.57	10.73	22.1	58.78	32.42	22.1	35.58	8.82	22.1	25.61	22.08	22.2	13.73
23.1	14.57	10.39	23.1	58.73	32.09	23.1	35.54	8.48	23.1	25.23	21.91	23.2	13.63
24.1	14.57	10.05	24.1	58.65	31.77	24.1	35.50	8.17	24.1	24.86	21.72	24.1	13.55
25.1	14.56	9.73	25.1	58.56	31.45	25.1	35.45	7.89	25.1	24.51	21.49	25.1	13.45
26.1	14.53	9.42	26.1	58.43	31.13	26.1	35.39	7.60	26.1	24.19	21.26	26.1	13.32
27.1	14.49	9.09	27.1	58.31	30.81	27.1	35.31	7.31	27.1	23.90	21.02	27.1	13.20
28.0	14.45	8.73	28.1	58.16	30.46	28.1	35.23	7.00	28.1	23.65	20.79	28.1	13.07
29.0	14.41	8.37	29.1	58.01	30.10	29.1	35.15	6.67	29.1	23.41	20.57	29.1	12.93
30.0	14.38	7.99	30.1	57.87	29.73	30.1	35.08	6.30	30.1	23.19	20.36	30.1	12.81
31.0	14.37	7.57	31.1	57.77	29.33	31.1	35.03	5.94	31.1	22.96	20.17	31.1	12.68
32.0	14.37	7.15	32.1	57.70	28.93	32.1	34.98	5.55	32.1	22.72	19.98	32.1	12.58

λ Octantis	υ Octantis	β Octantis	39 H. Cephei	γ^1 Oct
8.33 −8.27	15.89 −15.86	7.03 −6.96	18.24 +18.21	7.64
21^h 38^m $19^s.542$	22^h 16^m $8^s.656$	22^h 37^m $39^s.016$	23^h 27^m $44^s.125$	23^h 47^m
−83° 6′ 6″.99	−86° 23′ 27″.13	−81° 49′ 2″.34	+86° 50′ 58″.89	−82° 28′

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

. Cephei. Mag. 4.5		*α* Ursæ Minoris. (*Polaris.*) Mag. 2.1			4 G. Octantis. Mag. 5.6			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4		
Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
0 56	+85 49	Feb.	1 29	+88 52	Feb.	1 41	−85 11	Feb.	4 10	+85 20	Feb.	5 35	+85 9
s	″		s	″		s	″		s	″		s	″
2.48	11.89	0.2	57.76	11.47	0.2	59.10	32.00	0.3	15.51	34.50	0.4	31.60	47.57
2.24	11.79	1.2	56.84	11.41	1.2	58.81	31.81	1.3	15.32	34.64	1.4	31.47	47.79
2.00	11.69	2.2	55.88	11.36	2.2	58.54	31.61	2.3	15.12	34.78	2.4	31.34	48.02
1.75	11.59	3.2	54.86	11.31	3.2	58.29	31.41	3.3	14.93	34.91	3.4	31.21	48.26
1.47	11.46	4.2	53.79	11.24	4.2	58.04	31.21	4.3	14.70	35.05	4.4	31.05	48.50
1.20	11.34	5.2	52.68	11.18	5.2	57.81	31.00	5.3	14.46	35.20	5.4	30.88	48.74
0.91	11.20	6.2	51.56	11.09	6.2	57.58	30.80	6.3	14.20	35.35	6.4	30.70	48.99
0.63	11.04	7.2	50.43	10.97	7.2	57.36	30.61	7.3	13.93	35.49	7.3	30.50	49.22
0.35	10.86	8.2	49.32	10.84	8.2	57.12	30.43	8.3	13.67	35.58	8.3	30.29	49.42
0.09	10.66	9.2	48.24	10.67	9.2	56.89	30.25	9.3	13.39	35.66	9.3	30.07	49.62
9.85	10.44	10.2	47.23	10.50	10.2	56.66	30.09	10.3	13.12	35.72	10.3	29.84	49.77
9.61	10.22	11.2	46.28	10.32	11.2	56.41	29.92	11.3	12.85	35.76	11.3	29.62	49.93
9.40	10.01	12.2	45.41	10.15	12.2	56.14	29.74	12.3	12.60	35.77	12.3	29.40	50.08
9.20	9.82	13.2	44.59	9.97	13.2	55.87	29.55	13.3	12.37	35.79	13.3	29.20	50.22
9.03	9.62	14.2	43.80	9.82	14.2	55.60	29.31	14.3	12.15	35.81	14.3	29.01	50.33
8.85	9.44	15.2	43.04	9.69	15.2	55.33	29.09	15.3	11.95	35.85	15.3	28.83	50.46
58.66	9.28	16.2	42.23	9.56	16.2	55.09	28.82	16.3	11.74	35.90	16.3	28.69	50.61
58.47	9.13	17.2	41.38	9.45	17.2	54.84	28.53	17.3	11.54	35.98	17.3	28.51	50.78
58.24	8.97	18.2	40.48	9.33	18.2	54.63	28.22	18.3	11.31	36.07	18.3	28.34	50.95
58.00	8.79	19.1	39.50	9.19	19.2	54.44	27.91	19.3	11.07	36.15	19.3	28.15	51.14
57.76	8.57	20.1	38.49	9.03	20.2	54.24	27.63	20.3	10.80	36.22	20.3	27.92	51.32
57.52	8.34	21.1	37.49	8.85	21.2	54.06	27.38	21.3	10.52	36.27	21.3	27.68	51.47
57.29	8.07	22.1	36.53	8.61	22.1	53.86	27.14	22.3	10.22	36.28	22.3	27.43	51.61
57.09	7.79	23.1	35.66	8.38	23.1	53.64	26.91	23.2	9.94	36.25	23.3	27.17	51.71
56.91	7.51	24.1	34.88	8.13	24.1	53.42	26.68	24.2	9.67	36.19	24.3	26.92	51.79
56.77	7.24	25.1	34.19	7.89	25.1	53.19	26.44	25.2	9.42	36.13	25.3	26.68	51.84
56.63	7.00	26.1	33.56	7.64	26.1	52.95	26.17	26.2	9.18	36.08	26.3	26.45	51.89
56.50	6.75	27.1	32.94	7.44	27.1	52.71	25.91	27.2	8.96	36.04	27.3	26.24	51.94
56.37	6.52	28.1	32.33	7.24	28.1	52.48	25.59	28.2	8.74	36.00	28.3	26.04	52.00
56.24	6.29	29.1	31.69	7.02	29.1	52.27	25.26	29.2	8.53	35.98	29.3	25.83	52.08
56.09	6.05	30.1	31.00	6.82	30.1	52.07	24.93	30.2	8.30	35.95	30.3	25.63	52.16
55.92	5.80	31.1	30.27	6.61	31.1	51.88	24.60	31.2	8.07	35.94	31.3	25.40	52.26
	+13.68		50.68	+50.67		11.93	−11.89		12.32	+12.28		11.86	+11.82
57ᵐ	9ˢ.300	1ʰ	30ᵐ	13ˢ.156	1ʰ	42ᵐ	2ˢ.339	4ʰ	10ᵐ	2ˢ.561	5ʰ	35ᵐ	12ˢ.782
18′	45″.30	+88°	51′	43″.55	−85°	11′	21″.46	+85°	20′	10″.34	+85°	9′	30″.24

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

31 G. Mensæ. Mag. 6.2			ζ Mensæ. Mag. 5.6			51 H. Cephei. Mag. 5.3			25 H. Camelop. Mag. 5.1			7 G. Octa[ntis] Mag. 6.[...]	
Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m
Feb.	5 46	−84 49	Feb.	6 46	−80 43	Feb.	7 2	+87 11	Feb.	7 13	+82 34	Feb.	7 16
	s	″		s	″		s	″		s	″		s
0.4	20.59	57.30	0.4	63.41	46.99	0.4	42.24	2.81	0.4	57.81	36.35	0.4	33.22
1.4	20.34	57.54	1.4	63.32	47.32	1.4	42.15	3.08	1.4	57.78	36.62	1.4	32.95
2.4	20.10	57.75	2.4	63.22	47.63	2.4	42.04	3.36	2.4	57.77	36.90	2.4	32.67
3.4	19.85	57.95	3.4	63.11	47.92	3.4	41.94	3.65	3.4	57.74	37.18	3.4	32.37
4.4	19.60	58.13	4.4	63.01	48.18	4.4	41.82	3.96	4.4	57.71	37.49	4.4	32.07
5.4	19.37	58.30	5.4	62.90	48.43	5.4	41.67	4.28	5.4	57.67	37.80	5.4	31.78
6.4	19.13	58.47	6.4	62.80	48.67	6.4	41.49	4.61	6.4	57.62	38.12	6.4	31.49
7.4	18.91	58.64	7.4	62.69	48.92	7.4	41.29	4.92	7.4	57.55	38.43	7.4	31.21
8.4	18.68	58.80	8.4	62.59	49.17	8.4	41.06	5.23	8.4	57.47	38.72	8.4	30.94
9.4	18.47	58.98	9.4	62.49	49.43	9.4	40.80	5.52	9.4	57.38	39.01	9.4	30.68
10.3	18.24	59.16	10.4	62.39	49.70	10.4	40.53	5.79	10.4	57.29	39.28	10.4	30.42
11.3	18.01	59.37	11.4	62.28	49.97	11.4	40.25	6.03	11.4	57.20	39.53	11.4	30.16
12.3	17.77	59.58	12.4	62.18	50.27	12.4	39.98	6.26	12.4	57.10	39.76	12.4	29.89
13.3	17.52	59.79	13.4	62.07	50.57	13.4	39.73	6.48	13.4	57.02	39.99	13.4	29.58
14.3	17.25	60.00	14.4	61.95	50.87	14.4	39.50	6.69	14.4	56.94	40.20	14.4	29.26
15.3	16.97	60.19	15.4	61.83	51.16	15.4	39.30	6.90	15.4	56.87	40.41	15.4	28.90
16.3	16.69	60.34	16.4	61.70	51.41	16.4	39.10	7.12	16.4	56.81	40.64	16.4	28.53
17.3	16.40	60.49	17.4	61.56	51.64	17.4	38.91	7.36	17.4	56.75	40.88	17.4	28.13
18.3	16.11	60.60	18.4	61.42	51.85	18.4	38.71	7.62	18.4	56.70	41.14	18.4	27.73
19.3	15.83	60.69	19.4	61.29	52.05	19.4	38.49	7.89	19.4	56.62	41.40	19.4	27.34
20.3	15.56	60.77	20.4	61.16	52.24	20.4	38.22	8.17	20.4	56.54	41.69	20.4	26.97
21.3	15.31	60.86	21.4	61.03	52.42	21.4	37.92	8.44	21.4	56.43	41.97	21.4	26.62
22.3	15.06	60.96	22.4	60.90	52.61	22.4	37.58	8.68	22.4	56.30	42.22	22.4	26.28
23.3	14.81	61.09	23.4	60.78	52.81	23.4	37.22	8.89	23.4	56.18	42.44	23.4	25.95
24.3	14.55	61.22	24.4	60.66	53.04	24.4	36.85	9.09	24.4	56.04	42.64	24.4	25.61
25.3	14.28	61.36	25.4	60.53	53.29	25.4	36.50	9.27	25.4	55.91	42.83	25.4	25.26
26.3	14.01	61.51	26.3	60.41	53.54	26.4	36.17	9.42	26.4	55.80	42.98	26.4	24.90
27.3	13.72	61.65	27.3	60.27	53.79	27.4	35.85	9.57	27.4	55.70	43.13	27.4	24.52
28.3	13.43	61.76	28.3	60.13	54.00	28.4	35.56	9.73	28.4	55.60	43.28	28.4	24.11
29.3	13.14	61.87	29.3	59.98	54.20	29.4	35.27	9.90	29.4	55.49	43.45	29.4	23.68
30.3	12.84	61.93	30.3	59.83	54.39	30.3	34.98	10.08	30.4	55.40	43.64	30.4	23.24
31.3	12.54	61.99	31.3	59.69	54.54	31.3	34.67	10.26	31.4	55.29	43.84	31.4	22.81
	11.10	−11.06		6.21	−6.13		20.36	+20.34		7.74	+7.68		18.52 −1
	5^h 46^m $14^s.756$			6^h 46^m $58^s.546$			7^h 2^m $4^s.048$			7^h 13^m $42^s.294$			7^h 16^m 2
	−84° 49′ 46″.89			−80° 43′ 38″.16			+87° 10′ 54″.74			+82° 34′ 30″.13			−86° 54′

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

ridge 1119. ag. 7.0		ζ Octantis. Mag. 5.4			1 H. Draconis. Mag. 4.6			ζ Chamæleontis. Mag. 5.2			30 H. Camelop. Mag. 5.3		
Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
8 17	+88 52	Feb.	9 9	−85 19	Feb.	9 25	+81 41	Feb.	9 36	−80 34	Feb.	10 21	+82 58
s	″		s	″		s	″		s	″		s	″
7.01	59.48	0.5	8.74	59.61	0.5	35.46	31.70	0.5	28.47	8.11	0.6	19.22	38.21
7.05	59.75	1.5	8.72	60.04	1.5	35.51	31.94	1.5	28.48	8.55	1.6	19.32	38.43
7.11	60.06	2.5	8.69	60.45	2.5	35.57	32.21	2.5	28.49	8.98	2.6	19.42	38.66
7.16	60.37	3.5	8.64	60.85	3.5	35.64	32.49	3.5	28.49	9.39	3.6	19.53	38.91
7.19	60.70	4.5	8.58	61.22	4.5	35.69	32.79	4.5	28.49	9.77	4.6	19.63	39.17
7.18	61.03	5.5	8.52	61.58	5.5	35.74	33.10	5.5	28.49	10.16	5.6	19.73	39.44
7.10	61.40	6.5	8.46	61.94	6.5	35.79	33.41	6.5	28.48	10.52	6.6	19.83	39.75
6.94	61.74	7.5	8.40	62.29	7.5	35.82	33.74	7.5	28.47	10.88	7.5	19.92	40.06
6.71	62.08	8.5	8.35	62.64	8.5	35.84	34.08	8.5	28.46	11.23	8.5	19.98	40.38
6.42	62.42	9.5	8.30	63.00	9.5	35.85	34.41	9.5	28.45	11.60	9.5	20.03	40.70
6.07	62.74	10.5	8.26	63.36	10.5	35.85	34.73	10.5	28.46	11.96	10.5	20.08	41.02
5.70	63.04	11.5	8.23	63.74	11.5	35.84	35.05	11.5	28.46	12.34	11.5	20.12	41.32
5.30	63.33	12.5	8.19	64.11	12.5	35.83	35.34	12.5	28.46	12.75	12.5	20.15	41.61
4.92	63.60	13.5	8.15	64.53	13.5	35.82	35.62	13.5	28.46	13.15	13.5	20.18	41.89
4.59	63.85	14.5	8.09	64.94	14.5	35.82	35.88	14.5	28.45	13.58	14.5	20.21	42.16
4.31	64.11	15.5	8.00	65.37	15.5	35.84	36.14	15.5	28.44	14.02	15.5	20.26	42.41
24.09	64.38	16.5	7.90	65.79	16.5	35.86	36.40	16.5	28.41	14.46	16.5	20.31	42.65
23.90	64.65	17.5	7.78	66.19	17.5	35.89	36.67	17.5	28.38	14.88	17.5	20.38	42.91
23.68	64.96	18.5	7.64	66.57	18.5	35.91	36.94	18.5	28.34	15.27	18.5	20.45	43.20
23.43	65.27	19.5	7.50	66.93	19.5	35.92	37.26	19.5	28.30	15.64	19.5	20.51	43.50
23.09	65.58	20.5	7.37	67.26	20.5	35.93	37.59	20.5	28.25	16.00	20.5	20.56	43.82
22.66	65.90	21.5	7.25	67.59	21.5	35.93	37.93	21.5	28.21	16.35	21.5	20.60	44.15
22.12	66.23	22.5	7.15	67.92	22.5	35.90	38.26	22.5	28.16	16.71	22.5	20.60	44.49
21.51	66.52	23.5	7.05	68.27	23.5	35.86	38.59	23.5	28.13	17.07	23.5	20.61	44.83
20.84	66.78	24.5	6.95	68.63	24.5	35.82	38.89	24.5	28.11	17.45	24.5	20.60	45.15
20.18	67.02	25.5	6.85	69.01	25.5	35.77	39.17	25.5	28.08	17.84	25.5	20.58	45.45
19.55	67.26	26.4	6.75	69.40	26.5	35.72	39.43	26.5	28.05	18.25	26.5	20.57	45.73
18.97	67.48	27.4	6.63	69.81	27.5	35.68	39.68	27.5	28.02	18.67	27.5	20.55	46.02
18.41	67.70	28.4	6.50	70.20	28.5	35.65	39.94	28.5	27.98	19.08	28.5	20.55	46.29
17.89	67.94	29.4	6.35	70.58	29.5	35.62	40.19	29.5	27.94	19.48	29.5	20.55	46.56
17.38	68.21	30.4	6.18	70.95	30.5	35.60	40.47	30.5	27.88	19.86	30.5	20.57	46.84
16.87	68.46	31.4	6.01	71.29	31.4	35.58	40.75	31.5	27.82	20.24	31.5	20.58	47.15
	+51.36		12.30	−12.25		6.92	+6.85		6.10	−6.02		8.18	+8.12
15m	48s.380	9h	8m	57s.938	9h	25m	21s.719	9h	36m	22s.347	10h	21m	4s.831
53′	0″.29	−85°	19′	57″.45	+81°	41′	41″.50	−80°	34′	6″.83	+82°	58′	54″.07

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT .

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

…tantis. …. 4.1		Groombridge 2283. Mag. 7.2			ρ Octantis. Mag. 5.7			ε Ursæ Minoris. Mag. 4.4			59 G. Apodis. Mag. 5.9		
…ght …en- …n.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
13	−83 17	Feb.	15 3	+87 32	Feb.	15 23	−84 11	Feb.	16 54	+82 10	Feb.	17 15	−80 46
s	″		s	″		s	″		s	″		s	″
.69	11.01	0.8	32.53	42.60	0.8	58.62	19.39	0.8	17.79	10.57	0.9	54.32	56.84
.93	11.18	1.8	32.98	42.52	1.8	58.91	19.42	1.8	17.90	10.37	1.9	54.49	56.69
.15	11.36	2.8	33.45	42.45	2.8	59.19	19.48	2.8	18.03	10.14	2.8	54.66	56.56
.37	11.54	3.8	33.95	42.37	3.8	59.46	19.54	3.8	18.16	9.93	3.8	54.83	56.44
.57	11.72	4.8	34.47	42.29	4.8	59.71	19.60	4.8	18.30	9.71	4.8	54.99	56.34
.76	11.90	5.8	35.01	42.23	5.8	59.96	19.68	5.8	18.44	9.50	5.8	55.14	56.25
.95	12.07	6.7	35.56	42.18	6.8	60.20	19.76	6.8	18.59	9.29	6.8	55.29	56.15
.13	12.25	7.7	36.11	42.15	7.8	60.43	19.81	7.8	18.74	9.09	7.8	55.42	56.06
.32	12.39	8.7	36.66	42.14	8.8	60.67	19.87	8.8	18.91	8.91	8.8	55.56	55.96
.51	12.53	9.7	37.21	42.17	9.8	60.90	19.91	9.8	19.06	8.77	9.8	55.70	55.82
.69	12.68	10.7	37.73	42.20	10.8	61.14	19.95	10.8	19.21	8.63	10.8	55.84	55.69
.91	12.83	11.7	38.22	42.25	11.7	61.40	19.98	11.8	19.37	8.53	11.8	55.98	55.55
.13	13.00	12.7	38.69	42.31	12.7	61.66	20.01	12.8	19.52	8.43	12.8	56.15	55.42
.35	13.17	13.7	39.15	42.36	13.7	61.93	20.07	13.8	19.66	8.32	13.8	56.32	55.28
.57	13.36	14.7	39.58	42.41	14.7	62.22	20.15	14.8	19.80	8.23	14.8	56.49	55.15
.80	13.60	15.7	40.00	42.43	15.7	62.51	20.23	15.8	19.94	8.13	15.8	56.68	55.05
.02	13.86	16.7	40.46	42.43	16.7	62.80	20.37	16.8	20.07	8.00	16.8	56.87	54.99
.22	14.12	17.7	40.92	42.43	17.7	63.08	20.53	17.8	20.22	7.87	17.8	57.06	54.93
.42	14.38	18.7	41.43	42.43	18.7	63.35	20.70	18.8	20.36	7.72	18.8	57.25	54.90
.60	14.64	19.7	41.95	42.43	19.7	63.59	20.86	19.8	20.53	7.56	19.8	57.42	54.89
.77	14.88	20.7	42.49	42.47	20.7	63.83	21.01	20.8	20.69	7.42	20.8	57.58	54.86
.93	15.12	21.7	43.04	42.54	21.7	64.05	21.14	21.8	20.86	7.32	21.8	57.73	54.83
.09	15.32	22.7	43.56	42.64	22.7	64.27	21.26	22.8	21.04	7.25	22.8	57.88	54.78
.27	15.52	23.7	44.06	42.77	23.7	64.51	21.37	23.8	21.20	7.20	23.8	58.02	54.71
.46	15.72	24.7	44.53	42.90	24.7	64.75	21.47	24.8	21.36	7.16	24.8	58.17	54.62
.65	15.94	25.7	44.96	43.03	25.7	65.01	21.55	25.8	21.51	7.16	25.8	58.34	54.54
.86	16.16	26.7	45.38	43.16	26.7	65.28	21.67	26.8	21.66	7.16	26.8	58.52	54.45
7.06	16.41	27.7	45.78	43.28	27.7	65.55	21.80	27.8	21.81	7.12	27.8	58.71	54.40
7.27	16.69	28.7	46.19	43.38	28.7	65.83	21.97	28.8	21.96	7.09	28.8	58.90	54.37
7.46	16.98	29.7	46.60	43.48	29.7	66.10	22.16	29.8	22.11	7.06	29.8	59.08	54.36
7.64	17.29	30.7	47.05	43.58	30.7	66.36	22.35	30.8	22.27	7.02	30.8	59.27	54.37
7.81	17.59	31.7	47.51	43.69	31.7	66.60	22.56	31.8	22.44	6.97	31.8	59.45	54.38
	−8.50		23.35	+23.32		9.88	−9.83		7.34	+7.27		6.24	−6.16
…3m	27s.793	15h	3m	41s.175	15h	23m	56s.594	16h	54m	25s.488	17h	15m	54s.896
…7′	21″.03	+87°	33′	10″.52	−84°	11′	30″.39	+82°	10′	32″.75	−80°	47′	6″.56

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT .

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

...ctantis. Mag. 5.4		υ Octantis. Mag. 5.7			β Octantis. Mag. 4.3			39 H. Cephei. Mag. 5.6			γ¹ Octantis. Mag. 5.1		
...ight Ascen-sion.	Decli-nation.	Wash. Mean Time.	Right Ascen-sion.	Decli-nation.	Wash. Mean Time.	Right Ascen-sion.	Decli-nation.	Wash. Mean Time.	Right Ascen-sion.	Decli-nation.	Wash. Mean Time.	Right Ascen-sion.	Decli-nation.
h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
1 38	−83 5	Feb.	22 15	−86 23	Feb.	22 37	−81 48	Feb.	23 27	+86 51	Feb.	23 47	−82 28
s	″		s	″		s	″		s	″		s	″
4.37	67.15	1.1	57.70	28.93	1.1	34.98	65.55	1.1	22.72	19.98	1.1	12.58	54.81
4.38	66.76	2.1	57.64	28.52	2.1	34.94	65.17	2.1	22.46	19.78	2.1	12.48	54.48
4.41	66.37	3.1	57.60	28.14	3.1	34.92	64.78	3.1	22.19	19.59	3.1	12.39	54.16
4.44	66.00	4.1	57.58	27.76	4.1	34.90	64.42	4.1	21.91	19.36	4.1	12.31	53.84
4.47	65.64	5.1	57.57	27.38	5.1	34.88	64.05	5.1	21.62	19.12	5.1	12.24	53.52
4.50	65.30	6.0	57.56	27.02	6.1	34.87	63.73	6.1	21.33	18.88	6.1	12.17	53.21
4.53	64.96	7.0	57.53	26.68	7.1	34.84	63.40	7.1	21.05	18.60	7.1	12.09	52.92
4.54	64.63	8.0	57.50	26.34	8.1	34.81	63.08	8.1	20.78	18.33	8.1	12.01	52.63
4.55	64.31	9.0	57.47	26.01	9.1	34.79	62.76	9.1	20.55	18.04	9.1	11.94	52.34
4.56	63.97	10.0	57.42	25.67	10.1	34.75	62.44	10.1	20.34	17.73	10.1	11.84	52.04
4.57	63.63	11.0	57.36	25.31	11.1	34.71	62.09	11.1	20.15	17.41	11.1	11.74	51.75
4.57	63.26	12.0	57.30	24.93	12.0	34.67	61.73	12.1	19.98	17.13	12.1	11.65	51.43
4.58	62.86	13.0	57.24	24.53	13.0	34.62	61.36	13.1	19.84	16.86	13.1	11.55	51.12
4.61	62.46	14.0	57.20	24.12	14.0	34.61	60.96	14.1	19.70	16.61	14.1	11.46	50.76
4.64	62.04	15.0	57.19	23.70	15.0	34.59	60.55	15.1	19.57	16.36	15.1	11.37	50.38
4.69	61.63	16.0	57.20	23.27	16.0	34.58	60.14	16.1	19.40	16.12	16.1	11.31	49.99
4.77	61.22	17.0	57.26	22.84	17.0	34.59	59.72	17.1	19.23	15.89	17.1	11.25	49.59
4.85	60.81	18.0	57.35	22.42	18.0	34.62	59.30	18.1	19.04	15.66	18.1	11.20	49.20
4.94	60.44	19.0	57.43	22.05	19.0	34.65	58.93	19.1	18.81	15.39	19.1	11.17	48.83
5.03	60.09	20.0	57.52	21.66	20.0	34.67	58.54	20.1	18.61	15.11	20.1	11.14	48.45
5.10	59.75	21.0	57.58	21.30	21.0	34.68	58.20	21.1	18.42	14.79	21.1	11.11	48.11
5.16	59.42	22.0	57.63	20.96	22.0	34.69	57.86	22.1	18.24	14.45	22.1	11.06	47.78
5.20	59.08	23.0	57.65	20.62	23.0	34.69	57.51	23.1	18.11	14.11	23.1	11.00	47.44
5.24	58.71	23.9	57.66	20.25	24.0	34.68	57.15	24.0	18.03	13.79	24.1	10.94	47.10
5.28	58.35	24.9	57.67	19.87	25.0	34.67	56.79	25.0	17.97	13.47	25.1	10.86	46.77
5.34	57.97	25.9	57.70	19.47	26.0	34.67	56.38	26.0	17.92	13.15	26.1	10.78	46.40
5.39	57.57	26.9	57.73	19.06	27.0	34.66	55.98	27.0	17.87	12.88	27.1	10.73	46.01
5.47	57.16	27.9	57.78	18.65	28.0	34.67	55.57	28.0	17.82	12.60	28.1	10.68	45.60
5.56	56.76	28.9	57.87	18.22	29.0	34.70	55.15	29.0	17.75	12.33	29.0	10.64	45.19
5.65	56.38	29.9	57.99	17.79	29.9	34.73	54.74	30.0	17.67	12.05	30.0	10.61	44.78
5.75	56.02	30.9	58.12	17.39	30.9	34.78	54.34	31.0	17.58	11.77	31.0	10.60	44.37
5.87	55.65	31.9	58.25	17.01	31.9	34.83	53.95	32.0	17.48	11.46	32.0	10.59	43.99
	−8.26		15.88	−15.85		7.03	−6.95		18.22	+18.20		7.64	−7.58
8ᵐ	19ˢ.542		22ʰ 16ᵐ	8ˢ.656		22ʰ 37ᵐ	39ˢ.016		23ʰ 27ᵐ	44ˢ.125		23ʰ 47ᵐ	16ˢ.424
6′	6″.99		−86° 23′	27″.13		−81° 49′	2″.34		+86° 50′	58″.89		−82° 28′	48″.42

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

G. Mensæ. Mag. 6.2		ζ Mensæ. Mag. 5.6			51 H. Cephei. Mag. 5.3			25 H. Camelop. Mag. 5.1			7 G. Octantis. Mag. 6.4		
Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
5 46	−84 50	Mar.	6 46	−80 43	Mar.	7 2	+87 11	Mar.	7 13	+82 34	Mar.	7 16	−86 54
s	″		s	″		s	″		s	″		s	″
13.43	1.76	0.3	60.13	54.00	0.4	35.56	9.73	0.4	55.60	43.28	0.4	24.11	21.82
13.14	1.87	1.3	59.98	54.20	1.4	35.27	9.90	1.4	55.49	43.45	1.4	23.68	22.06
12.84	1.93	2.3	59.83	54.39	2.3	34.98	10.08	2.4	55.40	43.64	2.4	23.24	22.30
12.54	1.99	3.3	59.69	54.54	3.3	34.67	10.26	3.4	55.29	43.84	3.4	22.81	22.49
12.26	2.02	4.3	59.54	54.69	4.3	34.35	10.46	4.4	55.17	44.05	4.4	22.39	22.68
11.97	2.05	5.3	59.40	54.83	5.3	34.01	10.66	5.3	55.05	44.25	5.3	21.96	22.85
11.70	2.08	6.3	59.26	54.95	6.3	33.64	10.86	6.3	54.92	44.45	6.3	21.55	23.01
11.44	2.11	7.3	59.11	55.08	7.3	33.23	11.06	7.3	54.78	44.66	7.3	21.15	23.18
11.17	2.14	8.3	58.98	55.20	8.3	32.82	11.24	8.3	54.63	44.85	8.3	20.76	23.35
10.91	2.18	9.3	58.84	55.33	9.3	32.39	11.39	9.3	54.47	45.01	9.3	20.38	23.53
10.64	2.23	10.3	58.70	55.49	10.3	31.96	11.53	10.3	54.31	45.16	10.3	20.01	23.72
10.38	2.32	11.3	58.56	55.64	11.3	31.53	11.65	11.3	54.15	45.31	11.3	19.62	23.92
10.10	2.38	12.3	58.43	55.80	12.3	31.11	11.75	12.3	53.99	45.41	12.3	19.21	24.13
9.81	2.45	13.3	58.28	55.96	13.3	30.72	11.82	13.3	53.85	45.50	13.3	18.79	24.34
9.51	2.50	14.3	58.13	56.12	14.3	30.35	11.89	14.3	53.72	45.59	14.3	18.35	24.55
9.20	2.52	15.3	57.97	56.27	15.3	30.01	11.97	15.3	53.59	45.68	15.3	17.88	24.75
8.88	2.53	16.3	57.81	56.38	16.3	29.68	12.07	16.3	53.48	45.79	16.3	17.39	24.91
8.57	2.51	17.3	57.65	56.47	17.3	29.35	12.18	17.3	53.36	45.91	17.3	16.89	25.05
8.28	2.47	18.3	57.49	56.53	18.3	29.00	12.30	18.3	53.24	46.04	18.3	16.40	25.18
7.99	2.41	19.3	57.33	56.59	19.3	28.64	12.43	19.3	53.11	46.18	19.3	15.93	25.28
7.71	2.35	20.3	57.17	56.63	20.3	28.22	12.56	20.3	52.96	46.32	20.3	15.47	25.37
7.45	2.31	21.3	57.02	56.68	21.3	27.77	12.67	21.3	52.79	46.44	21.3	15.04	25.47
7.18	2.28	22.3	56.88	56.74	22.3	27.31	12.75	22.3	52.62	46.54	22.3	14.63	25.58
6.92	2.27	23.3	56.74	56.83	23.3	26.84	12.81	23.3	52.44	46.60	23.3	14.22	25.71
6.64	2.28	24.3	56.59	56.94	24.3	26.37	12.84	24.3	52.27	46.65	24.3	13.80	25.85
6.37	2.28	25.3	56.45	57.04	25.3	25.94	12.85	25.3	52.11	46.68	25.3	13.37	26.01
6.08	2.29	26.3	56.30	57.15	26.3	25.52	12.83	26.3	51.96	46.71	26.3	12.92	26.16
5.79	2.28	27.3	56.13	57.24	27.3	25.13	12.82	27.3	51.81	46.72	27.3	12.45	26.30
5.47	2.24	28.3	55.97	57.30	28.3	24.76	12.84	28.3	51.68	46.75	28.3	11.96	26.43
5.18	2.19	29.3	55.81	57.35	29.3	24.39	12.87	29.3	51.54	46.78	29.3	11.46	26.53
4.89	2.11	30.3	55.64	57.37	30.3	24.02	12.90	30.3	51.41	46.82	30.3	10.97	26.61
4.60	2.01	31.3	55.48	57.38	31.3	23.63	12.94	31.3	51.27	46.88	31.3	10.47	26.67
11	−11.06		6.21	−6.13		20.37	+20.35		7.74	+7.68		18.53	−18.51
46^m 14^s.756			6^h 46^m 58^s.546			7^h 2^m 4^s.048			7^h 13^m 42^s.294			7^h 16^m 20^s.292	
49′ 46″.89			−80° 43′ 38″.16			+87° 10′ 54″.74			+82° 34′ 30″.13			−86° 54′ 6″.70	

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT .

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT .

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Octantis. Mag. 4.1			Groombridge 2283. Mag. 7.2			ρ Octantis. Mag. 5.7			ε Ursæ Minoris. Mag. 4.4			59 G. Ma	
Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	R A s
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Mar.	14 13	−83 17	Mar.	15 3	+87 32	Mar.	15 24	−84 11	Mar.	16 54	+82 10	Mar.	1
	s	″		s	″		s	″		s	″		
0.7	37.27	16.69	0.7	46.19	43.38	0.7	5.83	21.97	0.8	21.96	7.09	0.8	5
1.6	37.46	16.98	1.7	46.60	43.48	1.7	6.10	22.16	1.8	22.11	7.06	1.8	5
2.6	37.64	17.29	2.7	47.05	43.58	2.7	6.36	22.35	2.8	22.27	7.02	2.8	5
3.6	37.81	17.59	3.7	47.51	43.69	3.7	6.60	22.56	3.8	22.44	6.97	3.8	5
4.6	37.96	17.88	4.7	47.98	43.81	4.7	6.83	22.77	4.8	22.60	6.93	4.8	5
5.6	38.10	18.19	5.7	48.48	43.94	5.7	7.05	22.97	5.8	22.77	6.88	5.8	5
6.6	38.25	18.47	6.7	48.96	44.09	6.7	7.25	23.18	6.7	22.94	6.87	6.8	5
7.6	38.38	18.75	7.7	49.45	44.25	7.7	7.46	23.37	7.7	23.11	6.86	7.8	6
8.6	38.53	19.02	8.7	49.93	44.43	8.7	7.67	23.55	8.7	23.28	6.87	8.8	6
9.6	38.67	19.27	9.7	50.38	44.62	9.7	7.88	23.71	9.7	23.45	6.91	9.8	6
10.6	38.81	19.52	10.7	50.81	44.84	10.7	8.09	23.87	10.7	23.62	6.97	10.8	6
11.6	38.99	19.78	11.7	51.20	45.06	11.7	8.32	24.04	11.7	23.77	7.05	11.7	6
12.6	39.15	20.05	12.7	51.56	45.28	12.7	8.56	24.21	12.7	23.92	7.13	12.7	6
13.6	39.32	20.33	13.7	51.90	45.49	13.7	8.81	24.40	13.7	24.07	7.22	13.7	6
14.6	39.50	20.65	14.6	52.22	45.69	14.7	9.07	24.62	14.7	24.22	7.30	14.7	6
15.6	39.68	20.98	15.6	52.56	45.87	15.7	9.33	24.85	15.7	24.37	7.35	15.7	6
16.6	39.83	21.34	16.6	52.90	46.02	16.7	9.57	25.12	16.7	24.50	7.40	16.7	6
17.6	39.97	21.70	17.6	53.27	46.18	17.7	9.80	25.40	17.7	24.66	7.43	17.7	6
18.6	40.11	22.06	18.6	53.68	46.35	18.7	10.00	25.68	18.7	24.80	7.46	18.7	6
19.6	40.21	22.40	19.6	54.09	46.52	19.7	10.20	25.94	19.7	24.98	7.50	19.7	6
20.6	40.32	22.74	20.6	54.50	46.73	20.6	10.38	26.20	20.7	25.14	7.56	20.7	6
21.6	40.42	23.04	21.6	54.89	46.96	21.6	10.56	26.44	21.7	25.30	7.65	21.7	6
22.6	40.53	23.34	22.6	55.27	47.24	22.6	10.75	26.66	22.7	25.47	7.77	22.7	6
23.6	40.66	23.62	23.6	55.60	47.52	23.6	10.93	26.85	23.7	25.61	7.91	23.7	6
24.6	40.80	23.92	24.6	55.89	47.80	24.6	11.16	27.06	24.7	25.76	8.09	24.7	6
25.6	40.94	24.23	25.6	56.16	48.07	25.6	11.37	27.29	25.7	25.91	8.26	25.7	6
26.6	41.09	24.54	26.6	56.40	48.34	26.6	11.60	27.53	26.7	26.05	8.43	26.7	6
27.6	41.24	24.89	27.6	56.64	48.59	27.6	11.82	27.79	27.7	26.17	8.57	27.7	6
28.6	41.37	25.25	28.6	56.90	48.82	28.6	12.05	28.06	28.7	26.31	8.72	28.7	6
29.6	41.50	25.62	29.6	57.17	49.06	29.6	12.25	28.35	29.7	26.44	8.84	29.7	6
30.6	41.60	25.99	30.6	57.43	49.28	30.6	12.45	28.65	30.7	26.58	8.96	30.7	6
31.6	41.70	26.36	31.6	57.73	49.51	31.6	12.62	28.96	31.7	26.72	9.09	31.7	6
	8.56	−8.50		23.36	+23.33		9.88	−9.83		7.34	+7.27		6.24
	$14^h\ 13^m\ 27^s.793$			$15^h\ 3^m\ 41^s.175$			$15^h\ 23^m\ 56^s.594$			$16^h\ 54^m\ 25^s.488$			17^h 1
	−83° 17′ 21″.03			+87° 33′ 10″.52			−84° 11′ 30″.39			+82° 10′ 32″.75			−80° 4′

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

…noris. …4	χ Octantis. Mag. 5.2			λ Ursæ Minoris. Mag. 6.6			σ Octantis. Mag. 5.5			76 Draconis. Mag. 5.7		
Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
+86 36	Mar.	18 6	−87 39	Mar.	19 1	+89 0	Mar.	19 27	−89 13	Mar.	20 48	+82 13
″		s	″		s	″		s	″		s	″
29.86	0.8	18.14	37.50	0.9	16.00	46.48	0.9	32.15	13.92	0.9	29.01	24.88
29.76	1.8	18.83	37.39	1.8	16.87	46.31	1.9	33.86	13.68	1.9	29.07	24.61
29.62	2.8	19.50	37.31	2.8	17.75	46.12	2.9	35.59	13.46	2.9	29.14	24.34
29.49	3.8	20.16	37.25	3.8	18.67	45.92	3.9	37.30	13.26	3.9	29.21	24.05
29.39	4.8	20.80	37.18	4.8	19.65	45.71	4.9	38.99	13.07	4.9	29.29	23.75
29.26	5.8	21.41	37.13	5.8	20.70	45.52	5.9	40.62	12.88	5.9	29.37	23.44
29.14	6.8	22.01	37.08	6.8	21.80	45.33	6.9	42.20	12.70	6.9	29.45	23.13
29.04	7.8	22.59	37.02	7.8	22.96	45.14	7.9	43.72	12.53	7.9	29.54	22.83
28.97	8.8	23.16	36.95	8.8	24.17	44.98	8.8	45.19	12.33	8.9	29.64	22.55
28.92	9.8	23.73	36.87	9.8	25.42	44.83	9.8	46.65	12.13	9.9	29.75	22.29
28.88	10.8	24.32	36.78	10.8	26.67	44.72	10.8	48.13	11.90	10.9	29.87	22.03
28.87	11.8	24.91	36.67	11.8	27.90	44.61	11.8	49.65	11.68	11.9	29.99	21.79
28.86	12.8	25.55	36.57	12.8	29.08	44.52	12.8	51.26	11.46	12.9	30.12	21.59
28.86	13.8	26.23	36.48	13.8	30.20	44.45	13.8	52.96	11.23	13.9	30.22	21.39
28.87	14.8	26.92	36.41	14.8	31.25	44.39	14.8	54.79	11.02	14.9	30.33	21.21
28.86	15.8	27.63	36.35	15.8	32.25	44.30	15.8	56.72	10.82	15.9	30.45	21.01
28.82	16.8	28.37	36.33	16.8	33.22	44.19	16.8	58.70	10.64	16.9	30.54	20.80
28.77	17.8	29.09	36.33	17.8	34.22	44.06	17.8	60.68	10.50	17.9	30.64	20.58
28.72	18.8	29.76	36.35	18.8	35.28	43.93	18.8	62.61	10.37	18.9	30.74	20.34
28.67	19.8	30.42	36.36	19.8	36.42	43.80	19.8	64.46	10.25	19.9	30.85	20.10
28.63	20.8	31.03	36.39	20.8	37.64	43.68	20.8	66.18	10.13	20.9	30.97	19.85
28.63	21.8	31.61	36.40	21.8	38.94	43.58	21.8	67.83	10.01	21.9	31.10	19.61
28.67	22.8	32.18	36.38	22.8	40.28	43.52	22.8	69.43	9.88	22.9	31.23	19.40
28.71	23.8	32.78	36.34	23.8	41.63	43.48	23.8	71.01	9.72	23.9	31.38	19.21
28.80	24.7	33.38	36.30	24.8	42.94	43.47	24.8	72.67	9.55	24.9	31.52	19.06
28.88	25.7	34.04	36.26	25.8	44.18	43.46	25.8	74.41	9.38	25.9	31.68	18.90
28.97	26.7	34.72	36.22	26.8	45.36	43.46	26.8	76.24	9.21	26.9	31.82	18.76
29.03	27.7	35.42	36.21	27.8	46.48	43.45	27.8	78.17	9.06	27.9	31.96	18.63
29.10	28.7	36.12	36.22	28.8	47.57	43.44	28.8	80.14	8.92	28.9	32.10	18.51
29.16	29.7	36.82	36.26	29.8	48.67	43.42	29.8	82.15	8.82	29.8	32.22	18.37
29.20	30.7	37.49	36.32	30.8	49.78	43.38	30.8	84.14	8.73	30.8	32.34	18.22
29.25	31.7	38.16	36.38	31.8	50.93	43.34	31.8	86.08	8.64	31.8	32.48	18.05
·16.87	24.49		−24.47	58.01		+58.00	73.43		−73.42	7.39		+7.32
$1^s.307$	18^h	6^m	$11^s.893$	19^h	2^m	$39^s.624$	19^h	27^m	$42^s.218$	20^h	48^m	$40^s.494$
51″.17	−87°	39′	51″.82	+89°	1′	2″.17	−89°	13′	28″.57	+82°	13′	29″.86

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT .

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CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

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CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

119.	ζ Octantis. Mag. 5.4			1 H. Draconis. Mag. 4.6			ζ Chamæleontis. Mag. 5.2			30 H. Camelop. Mag. 5.3		
Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
88 53	Apr.	9 8	−85 20	Apr.	9 25	+81 41	Apr.	9 36	−80 34	Apr.	10 21	+82 58
″		s	″		s	″		s	″		s	″
3.62	0.4	60.46	19.72	0.4	33.38	47.63	0.4	25.59	29.37	0.4	18.94	55.08
3.76	1.4	60.21	19.94	1.4	33.29	47.84	1.4	25.47	29.63	1.4	18.86	55.34
3.89	2.4	59.96	20.15	2.4	33.19	48.06	2.4	25.36	29.87	2.4	18.77	55.60
4.02	3.3	59.71	20.35	3.4	33.07	48.29	3.4	25.25	30.10	3.4	18.67	55.89
4.17	4.3	59.46	20.55	4.4	32.94	48.52	4.4	25.14	30.32	4.4	18.56	56.17
4.27	5.3	59.23	20.75	5.4	32.82	48.72	5.4	25.04	30.56	5.4	18.43	56.44
4.36	6.3	59.00	20.95	6.4	32.68	48.89	6.4	24.94	30.80	6.4	18.30	56.68
4.43	7.3	58.78	21.17	7.4	32.53	49.05	7.4	24.84	31.03	7.4	18.15	56.91
4.49	8.3	58.56	21.40	8.3	32.39	49.20	8.4	24.74	31.28	8.4	18.01	57.13
4.50	9.3	58.34	21.65	9.3	32.26	49.32	9.4	24.65	31.55	9.4	17.87	57.32
4.51	10.3	58.09	21.90	10.3	32.13	49.43	10.3	24.55	31.83	10.4	17.72	57.50
4.53	11.3	57.84	22.14	11.3	32.01	49.53	11.3	24.44	32.11	11.4	17.60	57.67
4.54	12.3	57.56	22.39	12.3	31.91	49.62	12.3	24.31	32.37	12.4	17.50	57.82
4.57	13.3	57.28	22.59	13.3	31.80	49.74	13.3	24.19	32.61	13.4	17.39	57.99
14.60	14.3	56.98	22.78	14.3	31.71	49.87	14.3	24.06	32.84	14.4	17.29	58.16
14.65	15.3	56.69	22.93	15.3	31.61	50.01	15.3	23.93	33.03	15.4	17.19	58.35
14.71	16.3	56.39	23.08	16.3	31.48	50.13	16.3	23.80	33.21	16.4	17.07	58.56
14.76	17.3	56.12	23.23	17.3	31.35	50.29	17.3	23.67	33.37	17.4	16.94	58.79
14.80	18.3	55.85	23.36	18.3	31.21	50.43	18.3	23.55	33.53	18.4	16.80	59.00
14.82	19.3	55.61	23.49	19.3	31.06	50.56	19.3	23.44	33.69	19.4	16.63	59.20
14.80	20.3	55.38	23.66	20.3	30.91	50.66	20.3	23.33	33.87	20.4	16.46	59.35
14.76	21.3	55.14	23.83	21.3	30.75	50.74	21.3	23.23	34.05	21.3	16.29	59.50
14.69	22.3	54.90	24.01	22.3	30.60	50.79	22.3	23.12	34.28	22.3	16.13	59.63
14.62	23.3	54.64	24.19	23.3	30.47	50.82	23.3	23.00	34.50	23.3	15.98	59.73
14.55	24.3	54.37	24.38	24.3	30.33	50.85	24.3	22.88	34.71	24.3	15.83	59.82
14.48	25.3	54.08	24.54	25.3	30.22	50.89	25.3	22.76	34.91	25.3	15.69	59.92
14.43	26.3	53.79	24.68	26.3	30.10	50.93	26.3	22.63	35.09	26.3	15.56	60.04
14.40	27.3	53.49	24.79	27.3	29.98	50.99	27.3	22.49	35.24	27.3	15.43	60.17
14.37	28.3	53.19	24.89	28.3	29.87	51.07	28.3	22.36	35.37	28.3	15.30	60.29
14.35	29.3	52.90	24.96	29.3	29.74	51.15	29.3	22.22	35.48	29.3	15.17	60.42
14.33	30.3	52.60	25.04	30.3	29.61	51.22	30.3	22.08	35.58	30.3	15.02	60.56
14.29	31.3	52.32	25.10	31.3	29.47	51.29	31.3	21.95	35.67	31.3	14.86	60.69
1.49		12.31	−12.27		6.92	+6.85		6.11	−6.03		8.19	+8.12
s.380		9h 8m 57s.938			9h 25m 21s.719			9h 36m 22s.347			10h 21m 4s.831	
″.29			−85° 19′ 57″.45			+81° 41′ 41″.50			−80° 34′ 6″.83			+82° 58′ 54″.07

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

η Octantis. Mag. 6.3			Bradley 1672. Mag. 6.3			ι Octantis. Mag. 5.4			32 H. Camelop. *seq.* Mag. 5.3			κ Oc… Mag…	
Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Ri… Asc… sio…
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h
Apr.	11 0	−84 9	Apr.	12 15	+88 9	Apr.	12 46	−84 40	Apr.	12 48	+83 51	Apr.	13
	s	″		s	″		s	″		s	″		s
0.4	4.19	10.16	0.5	13.59	26.87	0.5	21.97	35.04	0.5	44.26	37.66	0.5	32.
1.4	4.08	10.50	1.5	13.57	27.18	1.5	21.98	35.43	1.5	44.28	37.97	1.5	32.
2.4	3.97	10.83	2.5	13.51	27.51	2.5	21.98	35.80	2.5	44.30	38.30	2.5	32.
3.4	3.85	11.16	3.5	13.44	27.84	3.5	21.97	36.16	3.5	44.31	38.63	3.5	33.
4.4	3.74	11.48	4.5	13.31	28.17	4.5	21.97	36.52	4.5	44.31	38.97	4.5	33.
5.4	3.64	11.79	5.5	13.14	28.51	5.5	21.96	36.87	5.5	44.29	39.32	5.5	33.
6.4	3.54	12.10	6.5	12.94	28.85	6.5	21.97	37.21	6.5	44.26	39.67	6.5	33.
7.4	3.46	12.40	7.5	12.69	29.18	7.5	21.99	37.54	7.5	44.22	40.02	7.5	33.
8.4	3.37	12.73	8.5	12.41	29.49	8.5	22.02	37.90	8.5	44.17	40.36	8.5	33.
9.4	3.29	13.09	9.5	12.11	29.78	9.5	22.05	38.28	9.5	44.11	40.68	9.5	33.
10.4	3.20	13.45	10.5	11.81	30.05	10.5	22.08	38.68	10.5	44.05	40.96	10.5	33.
11.4	3.10	13.81	11.5	11.53	30.32	11.5	22.09	39.09	11.5	43.99	41.24	11.5	33.
12.4	2.97	14.17	12.5	11.28	30.56	12.5	22.10	39.50	12.5	43.95	41.51	12.5	33.
13.4	2.84	14.54	13.5	11.07	30.80	13.5	22.09	39.92	13.5	43.92	41.77	13.5	33.
14.4	2.70	14.88	14.4	10.87	31.05	14.5	22.05	40.32	14.5	43.91	42.03	14.5	33.
15.4	2.55	15.18	15.4	10.69	31.33	15.5	22.00	40.70	15.5	43.88	42.31	15.5	33.
16.4	2.39	15.47	16.4	10.50	31.62	16.5	21.93	41.07	16.5	43.84	42.62	16.5	33.
17.4	2.24	15.74	17.4	10.26	31.91	17.5	21.87	41.42	17.5	43.80	42.94	17.5	33.
18.4	2.10	16.00	18.4	9.96	32.22	18.5	21.82	41.74	18.5	43.74	43.28	18.5	33.
19.4	1.96	16.27	19.4	9.59	32.53	19.5	21.79	42.06	19.5	43.66	43.62	19.5	33.
20.4	1.85	16.55	20.4	9.18	32.84	20.5	21.77	42.38	20.5	43.58	43.95	20.5	33.
21.4	1.74	16.83	21.4	8.75	33.12	21.5	21.76	42.72	21.5	43.47	44.27	21.5	33.
22.4	1.63	17.14	22.4	8.29	33.36	22.4	21.75	43.09	22.4	43.36	44.55	22.5	33.
23.4	1.50	17.46	23.4	7.85	33.59	23.4	21.73	43.46	23.4	43.25	44.80	23.5	33.
24.4	1.37	17.78	24.4	7.42	33.81	24.4	21.70	43.85	24.4	43.16	45.05	24.5	33
25.4	1.23	18.07	25.4	7.04	34.03	25.4	21.66	44.23	25.4	43.08	45.30	25.5	33.
26.4	1.06	18.37	26.4	6.66	34.24	26.4	21.60	44.61	26.4	42.99	45.54	26.5	33.
27.4	0.89	18.64	27.4	6.32	34.46	27.4	21.52	44.98	27.4	42.92	45.79	27.5	33.
28.4	0.71	18.89	28.4	5.99	34.69	28.4	21.44	45.34	28.4	42.84	46.05	28.5	33.
29.4	0.53	19.13	29.4	5.64	34.93	29.4	21.34	45.68	29.4	42.77	46.32	29.5	33.
30.4	0.35	19.36	30.4	5.27	35.18	30.4	21.24	46.00	30.4	42.69	46.60	30.5	33.
31.3	0.18	19.56	31.4	4.86	35.44	31.4	21.14	46.30	31.4	42.59	46.88	31.5	33.
9.82		−9.77	31.12		+31.11	10.78		−10.73	9.35		+9.30	12.38	
10ʰ	59ᵐ	55ˢ.280	12ʰ	14ᵐ	28ˢ.425	12ʰ	46ᵐ	7ˢ.152	12ʰ	48ᵐ	30ˢ.418	13ʰ	27
−84°	8′	50″.60	+88°	9′	36″.08	−84°	40′	22″.34	+83°	51′	50″.47	−85°	21

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

	Octantis. Mag. 4.1		Groombridge 2283. Mag. 7.2			ρ Octantis. Mag. 5.7			ε Ursæ Minoris. Mag. 4.4			59 G. Apodis. Mag. 5.9		
	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
	14 13	−83 17	Apr.	15 3	+87 32	Apr.	15 24	−84 11	Apr.	16 54	+82 10	Apr.	17 16	−80 46
	s	″		s	″		s	″		s	″		s	″
	41.70	26.36	0.6	57.73	49.51	0.6	12.62	28.96	0.7	26.72	9.09	0.7	4.14	55.89
	41.78	26.73	1.6	58.04	49.75	1.6	12.79	29.26	1.7	26.86	9.22	1.7	4.29	56.06
	41.86	27.09	2.6	58.35	50.02	2.6	12.93	29.57	2.7	27.01	9.37	2.7	4.44	56.21
	41.93	27.43	3.6	58.65	50.29	3.6	13.08	29.85	3.7	27.15	9.52	3.7	4.57	56.35
	42.01	27.77	4.6	58.93	50.59	4.6	13.23	30.14	4.7	27.31	9.69	4.7	4.71	56.49
	42.08	28.07	5.6	59.20	50.90	5.6	13.38	30.40	5.7	27.45	9.88	5.7	4.85	56.64
	42.16	28.38	6.6	59.43	51.21	6.6	13.53	30.64	6.7	27.59	10.11	6.7	4.98	56.74
	42.24	28.70	7.6	59.63	51.54	7.6	13.70	30.90	7.7	27.72	10.35	7.7	5.12	56.84
	42.35	29.01	8.6	59.80	51.86	8.6	13.88	31.16	8.7	27.85	10.59	8.7	5.27	56.95
	42.45	29.33	9.6	59.93	52.17	9.6	14.05	31.43	9.7	27.97	10.82	9.7	5.43	57.07
	42.55	29.69	10.6	60.06	52.47	10.6	14.24	31.71	10.7	28.07	11.06	10.7	5.60	57.19
	42.66	30.06	11.6	60.18	52.75	11.6	14.43	32.02	11.6	28.17	11.29	11.7	5.77	57.32
	42.75	30.45	12.6	60.31	53.02	12.6	14.62	32.34	12.6	28.28	11.49	12.7	5.95	57.49
	42.84	30.85	13.6	60.44	53.28	13.6	14.79	32.68	13.6	28.39	11.68	13.7	6.12	57.68
	42.89	31.26	14.6	60.61	53.54	14.6	14.93	33.03	14.6	28.49	11.87	14.7	6.26	57.88
	42.94	31.65	15.6	60.79	53.80	15.6	15.06	33.38	15.6	28.62	12.05	15.7	6.41	58.09
	42.98	32.01	16.6	60.98	54.08	16.6	15.17	33.71	16.6	28.74	12.25	16.7	6.55	58.30
	43.01	32.35	17.6	61.17	54.39	17.6	15.27	34.03	17.6	28.86	12.47	17.6	6.68	58.51
	43.05	32.69	18.6	61.32	54.71	18.6	15.38	34.32	18.6	28.97	12.73	18.6	6.78	58.70
	43.09	33.00	19.6	61.44	55.06	19.6	15.50	34.59	19.6	29.09	13.00	19.6	6.90	58.85
5	43.15	33.31	20.5	61.52	55.41	20.6	15.63	34.87	20.6	29.19	13.30	20.6	7.03	59.00
5	43.22	33.64	21.5	61.56	55.76	21.6	15.77	35.15	21.6	29.28	13.61	21.6	7.17	59.14
5	43.30	33.97	22.5	61.56	56.10	22.6	15.92	35.43	22.6	29.37	13.92	22.6	7.32	59.30
5	43.36	34.34	23.5	61.57	56.41	23.6	16.08	35.75	23.6	29.45	14.21	23.6	7.47	59.46
1.5	43.42	34.71	24.5	61.58	56.73	24.6	16.22	36.08	24.6	29.53	14.50	24.6	7.62	59.65
1.5	43.48	35.10	25.5	61.58	57.01	25.5	16.36	36.42	25.6	29.61	14.76	25.6	7.78	59.87
1.5	43.53	35.48	26.5	61.61	57.30	26.5	16.48	36.79	26.6	29.69	15.02	26.6	7.92	60.09
7.5	43.54	35.86	27.5	61.66	57.57	27.5	16.58	37.14	27.6	29.77	15.26	27.6	8.06	60.33
8.5	43.56	36.24	28.5	61.71	57.86	28.5	16.68	37.49	28.6	29.85	15.50	28.6	8.18	60.58
9.5	43.57	36.61	29.5	61.77	58.17	29.5	16.76	37.84	29.6	29.94	15.76	29.6	8.29	60.81
0.5	43.56	36.95	30.5	61.83	58.48	30.5	16.82	38.18	30.6	30.03	16.02	30.6	8.40	61.05
1.5	43.55	37.28	31.5	61.86	58.80	31.5	16.88	38.51	31.6	30.11	16.30	31.6	8.50	61.29
	8.56	−8.50		23.37	+23.35		9.88	−9.83		7.34	+7.27		6.24	−6.16
	14ʰ 13ᵐ	27ˢ.793		15ʰ 3ᵐ	41ˢ.175		15ʰ 23ᵐ	56ˢ.594		16ʰ 54ᵐ	25ˢ.488		17ʰ 15ᵐ	54ˢ.896
	83° 17′	21″.03		+87° 33′	10″.52		−84° 11′	30″.39		+82° 10′	32″.75		−80° 47′	6″.56

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Ursæ Minoris. Mag. 4.4			χ Octantis. Mag. 5.2			λ Ursæ Minoris. Mag. 6.6			σ Octantis. Mag. 5.5			76 Drac Mag.	
Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m
Apr.	17 58	+86 36	Apr.	18 6	−87 39	Apr.	19 1	+89 0	Apr.	19 28	−89 13	Apr.	20 48
	s	″		s	″		s	″		s	″		s
0.7	54.71	29.25	0.7	38.16	36.38	0.8	50.93	43.34	0.8	26.08	8.64	0.8	32.48
1.7	55.05	29.29	1.7	38.79	36.47	1.8	52.13	43.29	1.8	27.96	8.58	1.8	32.61
2.7	55.42	29.34	2.7	39.39	36.54	2.8	53.38	43.27	2.8	29.78	8.52	2.8	32.74
3.7	55.80	29.42	3.7	39.96	36.60	3.8	54.67	43.26	3.8	31.54	8.46	3.8	32.89
4.7	56.17	29.51	4.7	40.53	36.66	4.8	56.01	43.26	4.8	33.24	8.40	4.8	33.04
5.7	56.55	29.60	5.7	41.09	36.72	5.8	57.36	43.27	5.8	34.91	8.32	5.8	33.20
6.7	56.91	29.74	6.7	41.66	36.77	6.8	58.73	43.31	6.8	36.56	8.24	6.8	33.37
7.7	57.28	29.89	7.7	42.23	36.79	7.7	60.06	43.37	7.8	38.23	8.15	7.8	33.54
8.7	57.61	30.06	8.7	42.83	36.81	8.7	61.35	43.45	8.8	39.97	8.05	8.8	33.69
9.7	57.94	30.23	9.7	43.47	36.85	9.7	62.56	43.54	9.8	41.79	7.95	9.8	33.86
10.7	58.24	30.40	10.7	44.12	36.90	10.7	63.70	43.63	10.8	43.71	7.85	10.8	34.02
11.7	58.52	30.55	11.7	44.81	36.98	11.7	64.77	43.71	11.8	45.72	7.77	11.8	34.17
12.7	58.80	30.71	12.7	45.50	37.06	12.7	65.80	43.79	12.8	47.80	7.72	12.8	34.32
13.7	59.08	30.83	13.7	46.18	37.19	13.7	66.82	43.85	13.8	49.90	7.71	13.8	34.45
14.7	59.37	30.94	14.7	46.83	37.33	14.7	67.86	43.89	14.7	51.94	7.69	14.8	34.59
15.7	59.68	31.05	15.7	47.44	37.48	15.7	68.97	43.92	15.7	53.90	7.69	15.8	34.73
16.7	60.00	31.18	16.7	48.01	37.63	16.7	70.16	43.97	16.7	55.75	7.72	16.8	34.88
17.7	60.33	31.33	17.7	48.54	37.76	17.7	71.41	44.03	17.7	57.48	7.74	17.8	35.05
18.7	60.67	31.51	18.7	49.06	37.89	18.7	72.71	44.11	18.7	59.13	7.74	18.8	35.22
19.7	61.00	31.71	19.7	49.58	37.99	19.7	74.01	44.22	19.7	60.76	7.72	19.8	35.39
20.7	61.32	31.94	20.7	50.12	38.07	20.7	75.27	44.36	20.7	62.43	7.68	20.8	35.57
21.7	61.61	32.19	21.7	50.69	38.15	21.7	76.46	44.53	21.7	64.16	7.63	21.8	35.74
22.7	61.88	32.43	22.7	51.28	38.24	22.7	77.59	44.71	22.7	65.97	7.59	22.8	35.92
23.7	62.12	32.66	23.7	51.90	38.35	23.7	78.63	44.89	23.7	67.87	7.57	23.8	36.07
24.7	62.37	32.89	24.7	52.53	38.47	24.7	79.61	45.03	24.7	69.83	7.56	24.8	36.23
25.7	62.60	33.11	25.7	53.15	38.61	25.7	80.58	45.17	25.7	71.81	7.57	25.8	36.39
26.7	62.83	33.31	26.7	53.77	38.78	26.7	81.55	45.31	26.7	73.79	7.61	26.8	36.54
27.7	63.08	33.49	27.7	54.34	38.96	27.7	82.52	45.42	27.7	75.72	7.67	27.8	36.69
28.6	63.33	33.69	28.7	54.90	39.15	28.7	83.54	45.53	28.7	77.58	7.73	28.8	36.83
29.6	63.60	33.88	29.7	55.41	39.34	29.7	84.61	45.66	29.7	79.37	7.80	29.8	36.99
30.6	63.88	34.10	30.6	55.90	39.54	30.7	85.71	45.79	30.7	81.07	7.87	30.8	37.15
31.6	64.15	34.32	31.6	56.37	39.73	31.7	86.83	45.93	31.7	82.71	7.94	31.8	37.31
	16.90	+16.87		24.50	−24.48		58.01	+58.00		73.35	−73.34		7.39
	17h 59m	1s.307		18h 6m	11s.893		19h 2m	39s.624		19h 27m	42s.218		20h 48m
	+86° 36′	*51″.17*		*−87° 39′*	*51″.82*		+89° 1′	2″.17		−89° 13′	28″.57		+82° 13′

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

…antis. 5.4		υ Octantis. Mag. 5.7			β Octantis. Mag. 4.3			39 H. Cephei. Mag. 5.6			γ¹ Octantis. Mag. 5.1		
…ht …n- ….	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
38	−83 5	Apr.	22 16	−86 22	Apr.	22 37	−81 48	Apr.	23 27	+86 50	Apr.	23 47	−82 28
	″		s	″		s	″		s	″		s	″
32	46.51	0.9	2.96	66.95	0.9	36.56	43.65	0.9	18.87	62.81	0.9	10.79	33.14
48	46.26	1.9	3.23	66.66	1.9	36.66	43.33	1.9	18.97	62.52	1.9	10.85	32.77
64	46.01	2.9	3.49	66.36	2.9	36.76	43.00	2.9	19.10	62.21	2.9	10.91	32.41
79	45.77	3.9	3.73	66.07	3.9	36.87	42.70	3.9	19.24	61.90	3.9	10.97	32.05
.94	45.53	4.9	3.96	65.79	4.9	36.96	42.40	4.9	19.41	61.59	4.9	11.02	31.72
.08	45.27	5.9	4.18	65.53	5 9	37.05	42.10	5.9	19.60	61.27	5.9	11.06	31.39
.22	45.02	6.9	4.39	65.26	6.9	37.13	41.80	6.9	19.82	60.98	6.9	11.09	31.05
.35	44.76	7.9	4.59	64.95	7.9	37.21	41.48	7.9	20.05	60.69	7.9	11.12	30.69
.49	44.49	8.9	4.81	64.64	8.9	37.28	41.15	8.9	20.30	60.43	8.9	11.17	30.33
.65	44.20	9.9	5.03	64.32	9.9	37.38	40.81	9.9	20.57	60.19	9.9	11.21	29.93
.82	43.91	10.9	5.30	63.98	10.9	37.47	40.45	10.9	20.82	59.96	10.9	11.27	29.53
.99	43.62	11.9	5.57	63.65	11.9	37.60	40.09	11.9	21.06	59.74	11.9	11.33	29.14
.18	43.34	12.9	5.88	63.33	12.9	37.73	39.73	12.9	21.28	59.54	12.9	11.42	28.73
.39	43.09	13.9	6.21	63.03	13.9	37.87	39.40	13.9	21.47	59.32	13.9	11.51	28.34
.59	42.85	14.9	6.54	62.75	14.9	38.02	39.09	14.9	21.66	59.10	14.9	11.61	27.96
.79	42.65	15.9	6.88	62.50	15.9	38.15	38.81	15.9	21.83	58.85	15.9	11.71	27.59
.98	42.46	16.9	7.20	62.26	16.9	38.28	38.55	16.9	22.04	58.58	16.9	11.81	27.27
.16	42.28	17.9	7.49	62.03	17.9	38.39	38.29	17.9	22.27	58.32	17.9	11.90	26.95
.30	42.08	18.9	7.75	61.79	18.9	38.50	38.02	18.9	22.54	58.07	18.9	11.97	26.63
.47	41.88	19.9	8.00	61.56	19.9	38.60	37.75	19.9	22.84	57.82	19.9	12.03	26.32
.63	41.67	20.8	8.24	61.29	20.9	38.71	37.48	20.9	23.16	57.58	20.9	12.09	25.99
.79	41.44	21.8	8.50	61.02	21.9	38.81	37.18	21.9	23.50	57.38	21.9	12.15	25.65
.95	41.20	22.8	8.78	60.75	22.9	38.93	36.87	22.9	23.83	57.19	22.9	12.23	25.28
3.13	40.96	23.8	9.07	60.47	23.9	39.06	36.55	23.9	24.16	57.02	23.9	12.31	24.91
3.33	40.72	24.8	9.39	60.18	24.9	39.19	36.24	24.9	24.47	56.85	24.9	12.41	24.53
3.53	40.52	25.8	9.73	59.93	25.8	39.33	35.95	25.9	24.75	56.68	25.9	12.52	24.17
3.74	40.32	26.8	10.09	59.70	26.8	39.48	35.67	26.9	25.03	56.52	26.9	12.65	23.83
3.95	40.14	27.8	10.44	59.46	27.8	39.64	35.42	27.9	25.29	56.34	27.9	12.77	23.50
4.15	39.98	28.8	10.79	59.25	28.8	39.79	35.18	28.9	25.56	56.16	28.9	12.89	23.16
4.36	39.83	29.8	11.14	59.06	29.8	39.94	34.95	29.9	25.83	55.96	29.9	13.01	22.87
4.55	39.70	30.8	11.48	58.87	30.8	40.09	34.74	30.9	26.12	55.75	30.9	13.12	22.57
4.74	39.60	31.8	11.79	58.69	31.8	40.22	34.54	31.9	26.42	55.55	31.9	13.23	22.28
	−8.26		15.86	−15.82		7.02	−6.95		18.20	+18.17		7.64	−7.57
38ᵐ	19ˢ.542		22ʰ 16ᵐ	8ˢ.656		22ʰ 37ᵐ	39ˢ.016		23ʰ 27ᵐ	44ˢ.125		23ʰ 47ᵐ	16ˢ.424
6′	6″.99		−86° 23′	27″.13		−81° 49′	2″.34		+86° 50′	58″.89		−82° 28′	48″.42

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

…ensæ. …5.2		ζ Mensæ. Mag. 5.6			51 H. Cephei. Mag. 5.3			25 H. Camelop. Mag. 5.1			7 G. Octantis. Mag. 6.4		
	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
ı	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
5	−84 49	May	6 46	−80 43	May	7 2	+87 11	May	7 13	+82 34	May	7 15	−86 54
	″		s	″		s	″		s	″		s	″
6	57.46	1.2	50.93	55.74	1.2	11.29	10.61	1.2	46.66	45.14	1.2	56.36	26.66
7	57.24	2.2	50.81	55.58	2.2	10.89	10.46	2.2	46.51	45.01	2.2	55.97	26.56
8	57.04	3.2	50.68	55.44	3.2	10.48	10.28	3.2	46.35	44.86	3.2	55.58	26.48
9	56.84	4.2	50.56	55.32	4.2	10.09	10.08	4.2	46.20	44.70	4.2	55.19	26.40
0	56.65	5.2	50.44	55.22	5.2	9.71	9.86	5.2	46.05	44.51	5.2	54.81	26.34
0	56.48	6.2	50.32	55.11	6.2	9.37	9.63	6.2	45.91	44.31	6.2	54.41	26.28
0	56.31	7.2	50.20	55.00	7.2	9.04	9.41	7.2	45.80	44.10	7.2	54.00	26.22
7	56.10	8.2	50.06	54.88	8.2	8.76	9.19	8.2	45.69	43.89	8.2	53.57	26.15
5	55.87	9.2	49.93	54.75	9.2	8.51	8.98	9.2	45.59	43.69	9.2	53.12	26.07
3	55.63	10.1	49.79	54.59	10.2	8.28	8.77	10.2	45.50	43.50	10.2	52.66	25.95
3	55.35	11.1	49.66	54.39	11.2	8.04	8.57	11.2	45.42	43.33	11.2	52.20	25.82
3	55.06	12.1	49.53	54.16	12.2	7.79	8.40	12.2	45.33	43.18	12.2	51.76	25.66
5	54.77	13.1	49.41	53.93	13.2	7.52	8.23	13.2	45.23	43.03	13.2	51.34	25.48
8	54.48	14.1	49.29	53.71	14.1	7.22	8.04	14.2	45.12	42.86	14.2	50.96	25.30
3	54.20	15.1	49.18	53.50	15.1	6.90	7.84	15.2	45.00	42.69	15.2	50.59	25.14
8	53.95	16.1	49.08	53.30	16.1	6.58	7.62	16.2	44.87	42.49	16.2	50.25	25.00
3	53.73	17.1	48.97	53.12	17.1	6.24	7.38	17.1	44.73	42.26	17.2	49.92	24.87
9	53.49	18.1	48.87	52.97	18.1	5.94	7.11	18.1	44.62	42.01	18.1	49.58	24.75
2	53.27	19.1	48.77	52.81	19.1	5.67	6.82	19.1	44.51	41.74	19.1	49.22	24.63
5	53.05	20.1	48.66	52.64	20.1	5.43	6.52	20.1	44.41	41.47	20.1	48.85	24.51
18	52.81	21.1	48.55	52.46	21.1	5.22	6.23	21.1	44.34	41.21	21.1	48.47	24.38
0	52.55	22.1	48.44	52.26	22.1	5.03	5.96	22.1	44.27	40.96	22.1	48.07	24.25
4	52.26	23.1	48.33	52.04	23.1	4.85	5.70	23.1	44.20	40.72	23.1	47.68	24.07
9	51.95	24.1	48.22	51.80	24.1	4.69	5.45	24.1	44.14	40.50	24.1	47.29	23.87
4	51.63	25.1	48.11	51.55	25.1	4.50	5.21	25.1	44.07	40.29	25.1	46.91	23.67
40	51.32	26.1	48.01	51.28	26.1	4.30	4.97	26.1	43.99	40.07	26.1	46.56	23.45
28	50.99	27.1	47.91	51.01	27.1	4.09	4.75	27.1	43.91	39.86	27.1	46.22	23.22
17	50.68	28.1	47.82	50.73	28.1	3.87	4.51	28.1	43.82	39.63	28.1	45.89	22.99
07	50.36	29.1	47.73	50.46	29.1	3.64	4.27	29.1	43.73	39.41	29.1	45.60	22.76
98	50.06	30.1	47.65	50.21	30.1	3.41	4.01	30.1	43.64	39.16	30.1	45.32	22.56
88	49.78	31.1	47.57	49.99	31.1	3.17	3.73	31.1	43.55	38.89	31.1	45.04	22.36
78	49.52	32.1	47.50	49.76	32.1	2.96	3.42	32.1	43.46	38.61	32.1	44.76	22.18
	−11.06		6.21	−6.13		20.37	+20.34		7.74	+7.68		18.53	−18.51
ı	$14^s.756$	6^h	46^m	$58^s.546$	7^h	2^m	$4^s.048$	7^h	13^m	$42^s.294$	7^h	16^m	$20^s.292$
	46″.89	−80°	43′	38″.16	+87°	10′	54″.74	+82°	34′	30″.13	−86°	54′	6″.70

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT .

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Octantis. Mag. 4.1			Groombridge 2283. Mag. 7.2			ρ Octantis. Mag. 5.7			ε Ursæ Minoris. Mag. 4.4			59 G. Ap[…] Mag. 5[…]	
Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m
May	14 13	−83 17	May	15 3	+87 32	May	15 24	−84 11	May	16 54	+82 10	May	17 16
	s	″		s	″		s	″		s	″		s
1.5	43.55	37.28	1.5	61.86	58.80	1.5	16.88	38.51	1.6	30.11	16.30	1.6	8.50
2.5	43.55	37.60	2.5	61.88	59.14	2.5	16.95	38.82	2.6	30.21	16.61	2.6	8.60
3.5	43.56	37.91	3.5	61.89	59.48	3.5	17.02	39.11	3.6	30.29	16.93	3.6	8.70
4.5	43.56	38.21	4.5	61.85	59.83	4.5	17.10	39.41	4.6	30.34	17.26	4.6	8.80
5.5	43.59	38.53	5.5	61.77	60.19	5.5	17.18	39.70	5.6	30.41	17.60	5.6	8.91
6.5	43.62	38.85	6.5	61.67	60.54	6.5	17.28	39.99	6.6	30.47	17.94	6.6	9.03
7.5	43.64	39.18	7.5	61.55	60.87	7.5	17.38	40.31	7.6	30.52	18.28	7.6	9.17
8.5	43.67	39.54	8.5	61.41	61.17	8.5	17.49	40.63	8.6	30.56	18.61	8.6	9.30
9.5	43.70	39.92	9.5	61.28	61.46	9.5	17.59	40.98	9.6	30.60	18.90	9.6	9.43
10.5	43.71	40.29	10.5	61.17	61.73	10.5	17.68	41.35	10.6	30.64	19.19	10.6	9.56
11.5	43.70	40.67	11.5	61.07	61.99	11.5	17.74	41.73	11.6	30.68	19.47	11.6	9.68
12.5	43.67	41.04	12.5	60.99	62.27	12.5	17.79	42.10	12.6	30.72	19.75	12.6	9.78
13.5	43.63	41.40	13.5	60.93	62.54	13.5	17.83	42.46	13.6	30.77	20.02	13.6	9.87
14.4	43.59	41.73	14.5	60.86	62.85	14.5	17.84	42.81	14.6	30.82	20.30	14.6	9.96
15.4	43.55	42.05	15.5	60.77	63.17	15.5	17.86	43.14	15.6	30.88	20.62	15.6	10.03
16.4	43.51	42.33	16.5	60.65	63.50	16.5	17.89	43.43	16.6	30.92	20.97	16.6	10.11
17.4	43.48	42.61	17.5	60.49	63.83	17.5	17.92	43.72	17.6	30.96	21.32	17.6	10.18
18.4	43.47	42.90	18.5	60.31	64.18	18.5	17.96	44.01	18.5	30.99	21.69	18.6	10.27
19.4	43.46	43.20	19.5	60.08	64.50	19.5	18.01	44.31	19.5	31.00	22.07	19.6	10.36
20.4	43.46	43.52	20.5	59.83	64.81	20.5	18.07	44.62	20.5	31.01	22.42	20.6	10.47
21.4	43.45	43.85	21.5	59.58	65.10	21.5	18.13	44.95	21.5	31.01	22.76	21.6	10.58
22.4	43.43	44.20	22.5	59.34	65.38	22.5	18.19	45.30	22.5	31.02	23.09	22.6	10.68
23.4	43.40	44.54	23.5	59.11	65.64	23.5	18.23	45.66	23.5	31.02	23.40	23.5	10.78
24.4	43.35	44.89	24.5	58.90	65.88	24.5	18.24	46.03	24.5	31.03	23.70	24.5	10.87
25.4	43.30	45.23	25.5	58.71	66.14	25.5	18.25	46.39	25.5	31.04	24.00	25.5	10.95
26.4	43.23	45.56	26.4	58.52	66.41	26.5	18.24	46.73	26.5	31.06	24.29	26.5	11.02
27.4	43.15	45.86	27.4	58.35	66.67	27.5	18.21	47.08	27.5	31.07	24.59	27.5	11.07
28.4	43.07	46.14	28.4	58.15	66.94	28.5	18.18	47.41	28.5	31.08	24.91	28.5	11.12
29.4	42.99	46.41	29.4	57.93	67.22	29.5	18.15	47.71	29.5	31.09	25.24	29.5	11.17
30.4	42.91	46.67	30.4	57.71	67.51	30.5	18.14	47.99	30.5	31.10	25.58	30.5	11.22
31.4	42.85	46.91	31.4	57.44	67.82	31.4	18.12	48.26	31.5	31.10	25.94	31.5	11.26
32.4	42.80	47.16	32.4	57.14	68.13	32.4	18.11	48.54	32.5	31.10	26.31	32.5	11.32
	8.56	−8.51		23.40	−23.38		9.89	−9.84		7.34	+7.27		6.24 -
14^h	13^m	$27^s.793$	15^h	3^m	$41^s.175$	15^h	23^m	$56^s.594$	16^h	54^m	$25^s.488$	17^h	15^m
−83°	17′	21″.03	+87°	33′	10″.52	−84°	11′	30″.39	+82°	10′	32″.75	−80°	47′

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

lantis
. 6.5

ght en- n.	D na	ell- ipti.
m		′
29	−8	13
		″
71	7	.50
30	8	.53
84	8	.57
41	8	.62
99	8	.72
65	8	.84
39	8	.97
23	8	.10
14	8	23
05	8	.34
94	8	.44
75	8	.53
43	8	.61
99	8	.69
45	9	.78
84	9	.90
22	9	.05
65	9	.23
17	9	41
77	9	.61
43	9	.82
12	9	.01
81	9	.19
44	10	.37
00	10	.52
49	10	68
88	10	.82
19	10	.99
43	11	.16
63	11	35
80	11	58
00	11	.81

−73.
m 42
28 ″ 86
494

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

λ Octantis. Mag. 5.4			υ Octantis. Mag. 5.7			β Octantis. Mag. 4.3			39 H. Cephei. Mag. 5.6			γ¹ Oct Mag.	
Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Righ Ascen sion.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m
May	21 38	−83 5	May	22 16	−86 22	May	22 37	−81 48	May	23 27	+86 50	May	23 4
	s	″		s	″		s	″		s	″		s
1.8	24.74	39.60	1.8	11.79	58.69	1.8	40.22	34.54	1.9	26.42	55.55	1.9	13.2
2.8	24.91	39.46	2.8	12.11	58.51	2.8	40.35	34.35	2.9	26.75	55.35	2.9	13.3
3.8	25.08	39.33	3.8	12.40	58.34	3.8	40.48	34.13	3.9	27.12	55.15	3.9	13.4
4.8	25.25	39.18	4.8	12.69	58.15	4.8	40.59	33.91	4.9	27.48	54.98	4.9	13.5
5.8	25.42	39.04	5.8	12.98	57.97	5.8	40.71	33.70	5.9	27.86	54.84	5.9	13.6
6.8	25.60	38.88	6.8	13.27	57.74	6.8	40.84	33.46	6.9	28.27	54.69	6.9	13.7
7.8	25.78	38.71	7.8	13.59	57.53	7.8	40.97	33.22	7.9	28.66	54.59	7.9	13.8
8.8	25.99	38.55	8.8	13.94	57.31	8.8	41.13	32.98	8.8	29.04	54.49	8.9	13.9
9.8	26.20	38.40	9.8	14.30	57.11	9.8	41.30	32.73	9.8	29.39	54.42	9.9	14.0
10.8	26.43	38.27	10.8	14.69	56.91	10.8	41.47	32.49	10.8	29.72	54.34	10.9	14.2
11.8	26.65	38.15	11.8	15.11	56.75	11.8	41.65	32.29	11.8	30.04	54.26	11.9	14.3
12.8	26.88	38.06	12.8	15.49	56.61	12.8	41.82	32.11	12.8	30.34	54.16	12.9	14.5
13.8	27.09	38.00	13.8	15.88	56.50	13.8	41.99	31.96	13.8	30.65	54.03	13.8	14.6
14.8	27.28	37.95	14.8	16.24	56.39	14.8	42.14	31.82	14.8	30.98	53.91	14.8	14.8
15.8	27.47	37.90	15.8	16.57	56.28	15.8	42.28	31.68	15.8	31.35	53.77	15.8	14.9
16.8	27.65	37.82	16.8	16.88	56.17	16.8	42.42	31.53	16.8	31.74	53.65	16.8	15.1
17.7	27.82	37.74	17.8	17.18	56.06	17.8	42.55	31.37	17.8	32.16	53.55	17.8	15.2
18.7	27.99	37.65	18.8	17.49	55.93	18.8	42.68	31.20	18.8	32.59	53.47	18.8	15.3
19.7	28.18	37.55	19.8	17.80	55.78	19.8	42.81	31.03	19.8	33.03	53.42	19.8	15.4
20.7	28.36	37.44	20.8	18.13	55.64	20.8	42.97	30.85	20.8	33.46	53.39	20.8	15.5
21.7	28.57	37.34	21.8	18.50	55.49	21.8	43.14	30.66	21.8	33.86	53.37	21.8	15.7
22.7	28.79	37.25	22.8	18.87	55.35	22.8	43.31	30.47	22.8	34.24	53.36	22.8	15.8
23.7	28.99	37.19	23.8	19.26	55.24	23.8	43.48	30.31	23.8	34.61	53.35	23.8	16.0
24.7	29.22	37.14	24.8	19.66	55.14	24.8	43.66	30.17	24.8	34.96	53.31	24.8	16.1
25.7	29.44	37.12	25.8	20.05	55.05	25.8	43.83	30.05	25.8	35.30	53.28	25.8	16.3
26.7	29.64	37.11	26.7	20.43	55.01	26.8	44.01	29.95	26.8	35.66	53.24	26.8	16.5
27.7	29.84	37.12	27.7	20.81	54.98	27.8	44.17	29.87	27.8	36.01	53.19	27.8	16.6
28.7	30.03	37.14	28.7	21.17	54.94	28.8	44.33	29.80	28.8	36.37	53.14	28.8	16.8
29.7	30.22	37.15	29.7	21.51	54.91	29.8	44.48	29.73	29.8	36.76	53.10	29.8	16.9
30.7	30.39	37.15	30.7	21.83	54.87	30.8	44.62	29.66	30.8	37.17	53.06	30.8	17.1
31.7	30.56	37.16	31.7	22.15	54.82	31.8	44.77	29.57	31.8	37.60	53.04	31.8	17.2
32.7	30.73	37.15	32.7	22.45	54.78	32.7	44.91	29.49	32.8	38.05	53.04	32.8	17.3
8.32		−8.26	15.85		−15.82	7.02		−6.95	18.19		+18.16	7.63	
21^h	38^m	$19^s.542$	22^h	16^m	$8^s.656$	22^h	37^m	$39^s.016$	23^h	27^m	$44^s.125$	23^h	47^m
−83°	6′	6″.99	−86°	23′	27″.13	−81°	49′	2″.34	+86°	50′	58″.89	−82°	28′

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

750.	Groombridge 944. Mag. 6 4		
Decli-nation.	Wash. Mean Time	Right Ascen-sion.	Decli-nation.
° ′		h m	° ′
85 20	June	5 35	+85 9
″		s	″
.5.00	1.0	10.63	37.35
.4.67	2.0	10.62	37.01
.4.34	3.0	10 63	36.64
.4.05	4.0	10.67	36.29
3.76	5.0	10.73	35.97
3.51	6.0	10.79	35.68
.3.27	7.0	10.86	35.39
.3.03	8.0	10.92	35.14
.2.81	9 0	10.98	34.88
.2.58	10.0	11.00	34.61
.2.33	11.0	11.01	34.34
.2.05	12.0	11.02	34.03
.1.76	13.0	11.05	33.71
.1 44	14.0	11.09	33.36
1.15	15.0	11.14	33.02
.0.86	15.9	11.22	32.68
.0.58	16.9	11.31	32.33
.0.34	17.9	11.42	32 01
.0.09	18 9	11.54	31.71
9.88	19.9	11.65	31.43
9.68	20.9	11.76	31 16
9.48	21.9	11.86	30.90
9.25	22 9	11.95	30.63
9.04	23.9	12 03	30 37
8.82	24.9	12.11	30.08
8.58	25.9	12.19	29.80
8.35	26.9	12.26	29.49
8.09	27 9	12 35	29 18
7.82	28.9	12.46	28.86
7.58	29.9	12.59	28.54
7.34	30.9	12.73	28.21
7.12	31 9	12.91	27.91
.26		11.85	+11.81
s.561		5^h 35^m $12^s.782$	
0″.34		+85° 9′ 30″.24	

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

31 G. Mensæ. Mag. 6.2			ζ Mensæ. Mag. 5.6			51 H. Cephei. Mag. 5.3			25 H. Camelop. Mag. 5.1			7 G. Oc Mag.	
Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascen sion.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m
June	5 45	−84 49	June	6 46	−80 43	June	7 2	+87 10	June	7 13	+82 34	June	7 1
	s	″		s	″		s	″		s	″		s
1.0	51.78	49.52	1.1	47.50	49.76	1.1	2.96	63.42	1.1	43.46	38.61	1.1	44.7
2.0	51.68	49.27	2.1	47.42	49.54	2.1	2.77	63.09	2.1	43.39	38.31	2.1	44.4
3.0	51.57	49.03	3.1	47.34	49.33	3.1	2.62	62.75	3.1	43.33	38.00	3.1	44.1
4.0	51.46	48.75	4.1	47.26	49.11	4.1	2.49	62.41	4.1	43.28	37.68	4.1	43.8
5.0	51.33	48.47	5.1	47.17	48.88	5.1	2.40	62.08	5.1	43.24	37.38	5.1	43.5
6.0	51.21	48.15	6.1	47.08	48.62	6.1	2.33	61.78	6.1	43.22	37.09	6.1	43.2
7.0	51.10	47.83	7.1	46.99	48.35	7.1	2.28	61.49	7.1	43.21	36.82	7.1	42.8
8.0	50.99	47.48	8.1	46.91	48.05	8.1	2.24	61.23	8.1	43.19	36.57	8.1	42.5
9.0	50.90	47.13	9.1	46.83	47.73	9.1	2.16	60.97	9.1	43.16	36.32	9.1	42.2
10.0	50.84	46.78	10.1	46.76	47.40	10.1	2.06	60.71	10.1	43.12	36.07	10.1	41.9
11.0	50.79	46.44	11.1	46.70	47.07	11.1	1.93	60.43	11.1	43.07	35.81	11.1	41.7
12.0	50.74	46.11	12.1	46.65	46.79	12.1	1.80	60.14	12.1	43.02	35.54	12.1	41.5
13.0	50.70	45.83	13.1	46.60	46.51	13.1	1.65	59.83	13.1	42.96	35.24	13.1	41.3
14.0	50.65	45.54	14.1	46.55	46.26	14.1	1.53	59.49	14.1	42.91	34.92	14.1	41.1
15.0	50.60	45.27	15.1	46.50	46.02	15.1	1.43	59.15	15.1	42.86	34.59	15.1	40.9
16.0	50.55	45.01	16.0	46.44	45.78	16.1	1.37	58.79	16.1	42.84	34.26	16.1	40.7
17.0	50.48	44.74	17.0	46.39	45.54	17.1	1.34	58.44	17.1	42.83	33.91	17.1	40.4
18.0	50.42	44.43	18.0	46.33	45.28	18.1	1.34	58.10	18.1	42.83	33.56	18.1	40.2
18.9	50.36	44.11	19.0	46.27	44.98	19.1	1.35	57.77	19.1	42.84	33.25	19.1	39.9
19.9	50.30	43.77	20.0	46.21	44.66	20.0	1.38	57.46	20.1	42.84	32.96	20.1	39.7
20.9	50.26	43.41	21.0	46.15	44.31	21.0	1.41	57.16	21.1	42.85	32.69	21.1	39.5
21.9	50.23	43.05	22.0	46.11	43.97	22.0	1.42	56.87	22.1	42.85	32.41	22.1	39.3
22.9	50.22	42.69	23.0	46.07	43.63	23.0	1.42	56.58	23.0	42.85	32.13	23.0	39.1
23.9	50.22	42.35	24.0	46.03	43.29	24.0	1.40	56.29	24.0	42.84	31.87	24.0	38.9
24.9	50.22	42.02	25.0	46.00	42.95	25.0	1.37	56.00	25.0	42.84	31.59	25.0	38.7
25.9	50.23	41.71	26.0	45.98	42.62	26.0	1.34	55.69	26.0	42.82	31.31	26.0	38.6
26.9	50.24	41.38	27.0	45.97	42.33	27.0	1.31	55.37	27.0	42.80	31.00	27.0	38.5
27.9	50.26	41.10	28.0	45.94	42.04	28.0	1.29	55.04	28.0	42.79	30.66	28.0	38.4
28.9	50.27	40.83	29.0	45.91	41.76	29.0	1.28	54.69	29.0	42.78	30.32	29.0	38.3
29.9	50.29	40.56	30.0	45.89	41.49	30.0	1.32	54.33	30.0	42.79	29.96	30.0	38.1
30.9	50.29	40.27	31.0	45.87	41.22	31.0	1.39	53.96	31.0	42.82	29.60	31.0	38.0
31.9	50.28	39.96	32.0	45.85	40.95	32.0	1.50	53.59	32.0	42.86	29.25	32.0	37.9
11.10		−11.05	6.21		−6.13	20.35		+20.32	7.74		+7.67	18.52	-
5^h	46^m	$14^s.756$	6^h	46^m	$58^s.546$	7^h	2^m	$4^s.048$	7^h	13^m	$42^s.294$	7^h	16^m
−84°	49′	46″.89	−80°	43′	38″.16	+87°	10′	54″.74	+82°	34′	30″.13	−86°	54′

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT .

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

η Octantis. Mag. 6.3		
Wash. Mean Time.	Right Ascension.	Declination.
	h m	° ′
June	10 59	−84 9
	s	″
1.3	54.59	24.73
2.3	54.43	24.82
3.3	54.25	24.91
4.3	54.09	25.03
5.3	53.90	25.14
6.3	53.70	25.25
7.2	53.49	25.35
8.2	53.26	25.42
9.2	53.03	25.47
10.2	52.81	25.49
11.2	52.60	25.48
12.2	52.41	25.47
13.2	52.22	25.45
14.2	52.04	25.45
15.2	51.88	25.47
16.2	51.71	25.50
17.2	51.54	25.53
18.2	51.35	25.57
19.2	51.16	25.61
20.2	50.95	25.63
21.2	50.73	25.60
22.2	50.50	25.57
23.2	50.30	25.52
24.2	50.09	25.46
25.2	49.89	25.37
26.2	49.69	25.28
27.2	49.51	25.20
28.2	49.34	25.11
29.2	49.17	25.05
30.2	49.01	24.98
31.2	48.84	24.93
32.2	48.68	24.89
	9.82	−9.77
	10^h 59^m $55^s.280$	
	−84° 8′ 50″.60	

Bradley 1672. Mag. 6.3		
Wash. Mean Time.	Right Ascension.	Declination.
	h m	° ′
June	12 14	+88 9
	s	″
1.3	47.44	40.21
2.3	46.71	40.28
3.3	45.99	40.33
4.3	45.28	40.37
5.3	44.60	40.38
6.3	43.97	40.37
7.3	43.35	40.36
8.3	42.78	40.35
9.3	42.24	40.38
10.3	41.66	40.42
11.3	41.06	40.46
12.3	40.41	40.50
13.3	39.71	40.54
14.3	38.97	40.57
15.3	38.21	40.57
16.3	37.46	40.54
17.3	36.71	40.51
18.3	36.02	40.46
19.3	35.37	40.37
20.3	34.76	40.30
21.3	34.16	40.24
22.3	33.57	40.19
23.3	32.99	40.15
24.3	32.39	40.12
25.3	31.76	40.08
26.2	31.11	40.03
27.2	30.43	39.99
28.2	29.72	39.94
29.2	28.99	39.89
30.2	28.26	39.79
31.2	27.53	39.67
32.2	26.83	39.53
	31.17	+31.15
	12^h 14^m $28^s.425$	
	+88° 9′ 36″.08	

ι Octantis. Mag. 5.4		
Wash. Mean Time.	Right Ascension.	Declination.
	h m	° ′
June	12 46	−84 40
	s	″
1.3	17.45	54.91
2.3	17.32	55.11
3.3	17.19	55.33
4.3	17.06	55.56
5.3	16.92	55.79
6.3	16.75	56.03
7.3	16.58	56.27
8.3	16.39	56.50
9.3	16.19	56.70
10.3	15.98	56.88
11.3	15.77	57.02
12.3	15.57	57.15
13.3	15.39	57.29
14.3	15.24	57.41
15.3	15.09	57.53
16.3	14.93	57.68
17.3	14.78	57.84
18.3	14.61	58.01
19.3	14.43	58.18
20.3	14.23	58.34
21.3	14.02	58.48
22.3	13.80	58.60
23.3	13.57	58.69
24.3	13.35	58.76
25.3	13.13	58.82
26.3	12.92	58.89
27.3	12.73	58.94
28.3	12.54	58.99
29.3	12.35	59.06
30.3	12 18	59.14
31.3	12.01	59.23
32.3	11.83	59.31
	10.79	−10.74
	12^h 46^m $7^s.152$	
	−84° 40′ 22″.34	

32 H. Camelop. seq. Mag. 5.3		
Wash. Mean Time.	Right Ascension.	Declination.
	h m	° ′
June	12 48	+83 51
	s	″
1.3	38.04	53.08
2.3	37.84	53.22
3.3	37.64	53.32
4.3	37.43	53.41
5.3	37.24	53.47
6.3	37.06	53.52
7.3	36.90	53.56
8.3	36.74	53.61
9.3	36.59	53.69
10.3	36.43	53.78
11.3	36.26	53.87
12.3	36.07	53.97
13.3	35.87	54.06
14.3	35.65	54.16
15.3	35.43	54.23
16.3	35.21	54.27
17.3	35.01	54.28
18.3	34.81	54.28
19.3	34.62	54.27
20.3	34.44	54.26
21.3	34.27	54.25
22.3	34.09	54.25
23.3	33.92	54.26
24.3	33.74	54.27
25.3	33.56	54.29
26.3	33.37	54.31
27.3	33.16	54.33
28.3	32.94	54.34
29.3	32.73	54.33
30.3	32.51	54.30
31.3	32.30	54.24
32.3	32.09	54.16
	9.36	+9.30
	12^h 48^m $30^s.418$	
	+83° 51′ 50″.47	

κ Octa[illegible] Mag. 5[illegible]	
Wash. Mean Time.	Right Ascension.
	h m
June	13 27
	s
1.4	30.68
2.4	30.56
3.4	30.45
4.4	30.34
5.4	30.21
6.4	30.06
7.4	29.90
8.3	29.72
9.3	29.52
10.3	29.30
11.3	29.09
12.3	28.90
13.3	28.71
14.3	28.56
15.3	28.40
16.3	28.26
17.3	28.09
18.3	27.92
19.3	27.75
20.3	27.55
21.3	27.32
22.3	27.09
23.3	26.86
24.3	26.63
25.3	26.39
26.3	26.15
27.3	25.94
28.3	25.74
29.3	25.55
30.3	25.36
31.3	25.17
32.3	24.98
	12.39 −
	13^h 27^m
	−85° 21′

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

ctantis. Mag. 4.1		Groombridge 2283. Mag. 7.2			ρ Octantis. Mag. 5.7			ε Ursæ Minoris. Mag. 4.4			59 G. Apodis. Mag. 5.9		
Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
4 13	−83 17	June	15 3	+87 33	June	15 24	−84 11	June	16 54	+82 10	June	17 16	−80 47
s	″		s	″		s	″		s	″		s	″
12.80	47.16	1.4	57.14	8.13	1.4	18.11	48.54	1.5	31.10	26.31	1.5	11.32	9.18
12.75	47.42	2.4	56.82	8.43	2.4	18.10	48.82	2.5	31.07	26.67	2.5	11.38	9.42
12.70	47.70	3.4	56.47	8.71	3.4	18.11	49.10	3.5	31.05	27.04	3.5	11.45	9.66
12.66	47.98	4.4	56.11	8.96	4.4	18.12	49.41	4.5	31.01	27.38	4.5	11.52	9.91
12.61	48.27	5.4	55.74	9.18	5.4	18.13	49.73	5.5	30.98	27.72	5.5	11.61	10.18
12.56	48.57	6.4	55.38	9.39	6.4	18.14	50.06	6.5	30.93	28.03	6.5	11.69	10.49
12.48	48.89	7.4	55.05	9.58	7.4	18.11	50.41	7.5	30.89	28.31	7.5	11.75	10.81
12.39	49.21	8.4	54.74	9.77	8.4	18.08	50.76	8.5	30.86	28.59	8.5	11.80	11.14
12.30	49.49	9.4	54.45	9.95	9.4	18.03	51.09	9.5	30.83	28.86	9.5	11.85	11.46
12.17	49.76	10.4	54.17	10.17	10.4	17.95	51.42	10.5	30.80	29.16	10.5	11.88	11.79
12.05	50.00	11.4	53.88	10.42	11.4	17.87	51.70	11.5	30.78	29.47	11.5	11.89	12.10
41.95	50.22	12.4	53.56	10.68	12.4	17.80	51.97	12.5	30.75	29.79	12.5	11.90	12.38
41.85	50.42	13.4	53.21	10.94	13.4	17.74	52.21	13.5	30.72	30.14	13.5	11.93	12.64
41.76	50.62	14.4	52.82	11.20	14.4	17.68	52.45	14.5	30.68	30.51	14.5	11.95	12.88
41.68	50.84	15.4	52.40	11.44	15.4	17.65	52.70	15.5	30.62	30.86	15.5	11.98	13.13
41.60	51.06	16.4	51.95	11.67	16.4	17.61	52.95	16.5	30.56	31.20	16.5	12.02	13.37
41.53	51.31	17.4	51.50	11.87	17.4	17.57	53.22	17.5	30.49	31.53	17.5	12.07	13.63
41.45	51.54	18.4	51.04	12.07	18.4	17.54	53.50	18.5	30.41	31.85	18.5	12.11	13.92
41.36	51.79	19.4	50.62	12.22	19.4	17.49	53.81	19.5	30.35	32.14	19.5	12.15	14.23
41.25	52.05	20.4	50.21	12.37	20.4	17.42	54.12	20.5	30.29	32.42	20.5	12.18	14.54
41.13	52.29	21.4	49.83	12.53	21.4	17.34	54.42	21.5	30.21	32.68	21.5	12.21	14.87
41.00	52.52	22.4	49.45	12.70	22.4	17.25	54.71	22.5	30.15	32.95	22.5	12.22	15.19
40.86	52.72	23.4	49.07	12.86	23.4	17.13	55.00	23.5	30.09	33.21	23.5	12.22	15.51
40.72	52.92	24.4	48.70	13.03	24.4	17.01	55.27	24.4	30.03	33.50	24.5	12.21	15.81
40.58	53.09	25.4	48.31	13.21	25.4	16.89	55.51	25.4	29.97	33.78	25.5	12.20	16.10
40.44	53.25	26.4	47.90	13.41	26.4	16.79	55.73	26.4	29.91	34.09	26.5	12.17	16.38
40.31	53.39	27.4	47.48	13.61	27.4	16.68	55.94	27.4	29.83	34.40	27.5	12.15	16.64
40.17	53.52	28.4	47.02	13.81	28.4	16.57	56.14	28.4	29.75	34.72	28.5	12.14	16.88
40.07	53.67	29.4	46.54	13.99	29.4	16.47	56.34	29.4	29.67	35.05	29.4	12.14	17.12
39.96	53.81	30.4	46.03	14.17	30.4	16.39	56.55	30.4	29.57	35.38	30.4	12.14	17.36
39.86	53.99	31.4	45.51	14.32	31.4	16.31	56.77	31.4	29.47	35.67	31.4	12.15	17.59
39.75	54.17	32.3	44.98	14.44	32.4	16.23	57.01	32.4	29.37	35.95	32.4	12.16	17.87
7	−8.51		23.42	+23.40		9.89	−9.84		7.35	+7.28		6.25	−6.17
13ᵐ	27ˢ.793		15ʰ 3ᵐ	41ˢ.175		15ʰ 23ᵐ	56ˢ.594		16ʰ 54ᵐ	25ˢ.488		17ʰ 15ᵐ	54ˢ.896
17′	21″.03		+87° 33′	10″.52		−84° 11′	30″.39		+82° 10′	32″.75		−80° 47′	6″.56

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Ursæ Minoris. Mag. 4.4			χ Octantis. Mag. 5.2			λ Ursæ Minoris. Mag. 6.6			σ Octantis. Mag. 5.5			76 Drac Mag.	
Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m
June	17 59	+86 36	June	18 7	−87 39	June	19 2	+89 0	June	19 30	−89 13	June	20 48
	s	″		s	″		s	″		s	″		s
1.6	8.97	43.35	1.6	9.48	46.59	1.6	51.42	53.43	1.6	11.00	11.65	1.7	41.9
2.6	9.02	43.72	2.6	9.78	46.82	2.6	51.96	53.76	2.6	12.23	11.80	2.7	42.14
3.5	9.06	44.08	3.6	10.10	47.05	3.6	52.42	54.11	3.6	13.52	11.96	3.7	42.2
4.5	9.06	44.44	4.6	10.46	47.27	4.6	52.78	54.45	4.6	14.91	12.12	4.7	42.40
5.5	9.05	44.78	5.5	10.82	47.53	5.6	53.07	54.77	5.6	16.37	12.28	5.7	42.5
6.5	9.03	45.10	6.5	11.19	47.81	6.6	53.30	55.07	6.6	17.86	12.46	6.7	42.6
7.5	9.01	45.39	7.5	11.52	48.12	7.6	53.51	55.36	7.6	19.32	12.69	7.7	42.7
8.5	9.01	45.67	8.5	11.82	48.45	8.6	53.73	55.63	8.6	20.72	12.93	8.7	42.8
9.5	9.01	45.95	9.5	12.09	48.77	9.6	54.03	55.90	9.6	22.01	13.17	9.7	42.9
10.5	9.04	46.24	10.5	12.30	49.10	10.6	54.39	56.17	10.6	23.15	13.45	10.6	43.0
11.5	9.07	46.55	11.5	12.47	49.41	11.6	54.79	56.46	11.6	24.16	13.70	11.6	43.1
12.5	9.09	46.88	12.5	12.62	49.69	12.6	55.22	56.77	12.6	25.08	13.94	12.6	43.2
13.5	9.10	47.24	13.5	12.77	49.95	13.6	55.63	57.10	13.6	25.96	14.14	13.6	43.4
14.5	9.11	47.61	14.5	12.94	50.19	14.6	55.99	57.46	14.6	26.87	14.35	14.6	43.5
15.5	9.08	47.98	15.5	13.14	50.44	15.6	56.26	57.82	15.6	27.82	14.54	15.6	43.6
16.5	9.04	48.35	16.5	13.36	50.68	16.6	56.44	58.20	16.6	28.86	14.74	16.6	43.7
17.5	8.96	48.71	17.5	13.59	50.95	17.6	56.54	58.56	17.6	29.97	14.94	17.6	43.8
18.5	8.87	49.05	18.5	13.83	51.22	18.6	56.56	58.90	18.6	31.10	15.16	18.6	43.9
19.5	8.78	49.37	19.5	14.06	51.53	19.5	56.56	59.23	19.6	32.24	15.41	19.6	44.0
20.5	8.69	49.67	20.5	14.25	51.85	20.5	56.56	59.55	20.6	33.34	15.68	20.6	44.1
21.5	8.61	49.96	21.5	14.42	52.18	21.5	56.56	59.83	21.6	34.39	15.95	21.6	44.1
22.5	8.53	50.26	22.5	14.56	52.51	22.5	56.59	60.13	22.6	35.32	16.23	22.6	44.2
23.5	8.47	50.55	23.5	14.66	52.84	23.5	56.67	60.42	23.6	36.17	16.51	23.6	44.3
24.5	8.42	50.86	24.5	14.72	53.16	24.5	56.75	60.73	24.6	36.93	16.81	24.6	44.4
25.5	8.36	51.17	25.5	14.77	53.47	25.5	56.87	61.04	25.6	37.60	17.11	25.6	44.5
26.5	8.30	51.48	26.5	14.81	53.77	26.5	56.98	61.35	26.5	38.20	17.38	26.6	44.6
27.5	8.21	51.82	27.5	14.84	54.05	27.5	57.09	61.70	27.5	38.76	17.63	27.6	44.6
28.5	8.13	52.16	28.5	14.86	54.33	28.5	57.15	62.05	28.5	39.31	17.88	28.6	44.7
29.5	8.03	52.53	29.5	14.90	54.59	29.5	57.13	62.41	29.5	39.90	18.13	29.6	44.8
30.5	7.90	52.89	30.5	14.97	54.85	30.5	57.05	62.78	30.5	40.54	18.37	30.6	44.9
31.5	7.74	53.24	31.5	15.07	55.11	31.5	56.88	63.17	31.5	41.26	18.60	31.6	45.0
32.5	7.56	53.58	32.5	15.18	55.38	32.5	56.60	63.53	32.5	42.04	18.85	32.6	45.0
	16.93	+16.90		24.53	−24.51		58.23	+58.23		73.52	−73.52		7.39
	17^h 59^m	$1^s.307$		18^h 6^m	$11^s.893$		19^h 2^m	$39^s.624$		19^h 27^m	$42^s.218$		20^h 48^m
	+86° 36′	51″.17		−87° 39′	51″.82		+89° 1′	2″.17		−89° 13′	28″.57		+82° 13′

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

ctantis. Mag. 5.4		υ Octantis. Mag. 5.7			β Octantis. Mag. 4.3			39 H. Cephei. Mag. 5.6			γ¹ Octantis. Mag. 5.1		
Right Ascen-sion.	Decli-nation.	Wash. Mean Time.	Right Ascen-sion.	Decli-nation.	Wash. Mean Time.	Right Ascen-sion.	Decli-nation.	Wash. Mean Time.	Right Ascen-sion.	Decli-nation.	Wash. Mean Time.	Right Ascen-sion.	Decli-nation.
h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
21 38	−83 5	June	22 16	−86 22	June	22 37	−81 48	June	23 27	+86 50	June	23 47	−82 28
s	″		s	″		s	″		s	″		s	″
30.73	37.15	1.7	22.45	54.78	1.7	44.91	29.49	1.8	38.05	53.04	1.8	17.39	14.66
30.90	37.12	2.7	22.77	54.72	2.7	45.05	29.39	2.8	38.49	53.06	2.8	17.53	14.50
31.08	37.09	3.7	23.09	54.64	3.7	45.20	29.28	3.8	38.94	53.10	3.8	17.67	14.30
31.27	37.06	4.7	23.45	54.57	4.7	45.36	29.16	4.8	39.37	53.16	4.8	17.82	14.10
31.49	37.04	5.7	23.81	54.50	5.7	45.53	29.05	5.8	39.75	53.24	5.8	17.99	13.89
31.70	37.03	6.7	24.22	54.43	6.7	45.71	28.95	6.8	40.14	53.31	6.8	18.16	13.70
31.92	37.05	7.7	24.62	54.40	7.7	45.89	28.89	7.8	40.51	53.38	7.8	18.34	13.52
32.13	37.09	8.7	25.03	54.40	8.7	46.08	28.83	8.8	40.84	53.44	8.8	18.53	13.36
32.35	37.17	9.7	25.42	54.40	9.7	46.26	28.80	9.8	41.19	53.49	9.8	18.73	13.22
32.54	37.25	10.7	25.80	54.45	10.7	46.44	28.79	10.8	41.54	53.53	10.8	18.90	13.11
32.71	37.34	11.7	26.14	54.49	11.7	46.59	28.79	11.8	41.91	53.56	11.8	19.07	13.03
32.87	37.42	12.7	26.46	54.52	12.7	46.72	28.79	12.8	42.31	53.59	12.8	19.22	12.95
33.04	37.48	13.7	26.76	54.55	13.7	46.87	28.79	13.7	42.74	53.64	13.8	19.36	12.87
33.18	37.54	14.7	27.04	54.58	14.7	47.00	28.78	14.7	43.19	53.71	14.8	19.50	12.78
33.34	37.59	15.7	27.35	54.59	15.7	47.14	28.74	15.7	43.64	53.81	15.8	19.64	12.66
33.51	37.62	16.7	27.65	54.60	16.7	47.29	28.70	16.7	44.07	53.93	16.8	19.79	12.54
33.68	37.66	17.7	27.98	54.60	17.7	47.46	28.67	17.7	44.49	54.06	17.8	19.95	12.42
33.87	37.71	18.7	28.35	54.59	18.7	47.62	28.63	18.7	44.88	54.21	18.8	20.13	12.29
34.07	37.79	19.7	28.72	54.62	19.7	47.79	28.62	19.7	45.26	54.35	19.7	20.31	12.18
34.26	37.88	20.7	29.09	54.66	20.7	47.97	28.62	20.7	45.61	54.49	20.7	20.48	12.08
34.46	37.98	21.7	29.46	54.73	21.7	48.15	28.64	21.7	45.95	54.61	21.7	20.67	12.01
34.64	38.10	22.7	29.83	54.81	22.7	48.31	28.67	22.7	46.28	54.74	22.7	20.86	11.96
34.82	38.25	23.7	30.17	54.91	23.7	48.48	28.73	23.7	46.62	54.84	23.7	21.04	11.91
34.98	38.40	24.7	30.50	55.03	24.7	48.63	28.81	24.7	46.98	54.94	24.7	21.21	11.88
35.13	38.55	25.7	30.82	55.15	25.7	48.77	28.88	25.7	47.34	55.07	25.7	21.38	11.86
35.27	38.70	26.7	31.11	55.28	26.7	48.91	28.96	26.7	47.72	55.18	26.7	21.54	11.85
35.42	38.85	27.7	31.39	55.37	27.7	49.04	29.03	27.7	48.12	55.30	27.7	21.68	11.84
35.55	38.99	28.7	31.66	55.48	28.7	49.17	29.09	28.7	48.52	55.44	28.7	21.83	11.83
35.68	39.12	29.7	31.93	55.58	29.7	49.30	29.14	29.7	48.94	55.61	29.7	21.98	11.81
35.82	39.22	30.7	32.21	55.67	30.7	49.43	29.19	30.7	49.35	55.79	30.7	22.13	11.78
35.98	39.32	31.7	32.50	55.73	31.7	49.57	29.24	31.7	49.76	56.01	31.7	22.28	11.73
36.15	39.44	32.6	32.82	55.79	32.7	49.73	29.27	32.7	50.13	56.23	32.7	22.45	11.67
2	−8.26		15.85	−15.81		7.02	−6.95		18.19	+18.16		7.63	−7.56
38ᵐ	19ˢ.542	22ʰ	16ᵐ	8ˢ.656	22ʰ	37ᵐ	39ˢ.016	23ʰ	27ᵐ	44ˢ.125	23ʰ	47ᵐ	16ˢ.424
6′	6″.99	−86°	23′	27″.13	−81°	49′	2″.34	+86°	50′	58″.89	−82°	28′	48″.42

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

...ensæ. 6.2		ζ Mensæ. Mag. 5.6			51 H. Cephei. Mag. 5.3			25 H. Camelop. Mag. 5.1			7 G. Octantis. Mag. 6.4		
t...	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
ı	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
5	−84 49	July	6 46	−80 43	July	7 2	+87 10	July	7 13	+82 34	July	7 15	−86 54
	″		s	″		s	″		s	″		s	″
9	40.27	1.0	45.87	41.22	1.0	1.39	53.96	1.0	42.82	29.60	1.0	38.06	14.65
3	39.96	2.0	45.85	40.95	2.0	1.50	53.59	2.0	42.86	29.25	2.0	37.92	14.39
3	39.65	3.0	45.82	40.64	3.0	1.63	53.24	3.0	42.91	28.92	3.0	37.76	14.12
7	39.34	3.9	45.79	40.33	4.0	1.78	52.92	4.0	42.97	28.62	4.0	37.59	13.81
7	39.00	4.9	45.77	40.00	5.0	1.94	52.62	5.0	43.03	28.32	5.0	37.43	13.50
0	38.63	5.9	45.75	39.65	6.0	2.09	52.34	6.0	43.08	28.03	6.0	37.29	13.18
4	38.27	6.9	45.74	39.29	7.0	2.21	52.06	7.0	43.13	27.76	7.0	37.18	12.84
9	37.93	7.9	45.73	38.93	7.9	2.31	51.78	8.0	43.17	27.49	8.0	37.10	12.49
5	37.59	8.9	45.74	38.59	8.9	2.38	51.48	9.0	43.18	27.22	9.0	37.05	12.17
2	37.27	9.9	45.75	38.27	9.9	2.44	51.17	10.0	43.20	26.92	10.0	37.02	11.85
9	36.99	10.9	45.76	37.98	10.9	2.52	50.82	10.9	43.23	26.57	10.9	37.01	11.56
6	36.74	11.9	45.77	37.69	11.9	2.61	50.46	11.9	43.26	26.21	11.9	36.99	11.29
2	36.49	12.9	45.78	37.42	12.9	2.73	50.10	12.9	43.30	25.86	12.9	36.96	11.03
8	36.22	13.9	45.79	37.14	13.9	2.90	49.73	13.9	43.36	25.51	13.9	36.93	10.76
2	35.95	14.9	45.79	36.86	14.9	3.09	49.37	14.9	43.44	25.16	14.9	36.87	10.50
7	35.66	15.9	45.80	36.56	15.9	3.32	49.03	15.9	43.52	24.82	15.9	36.80	10.21
3	35.35	16.9	45.81	36.25	16.9	3.54	48.72	16.9	43.61	24.51	16.9	36.74	9.90
9	35.04	17.9	45.82	35.92	17.9	3.77	48.43	17.9	43.70	24.22	17.9	36.69	9.58
8	34.71	18.9	45.83	35.58	18.9	3.99	48.14	18.9	43.78	23.94	18.9	36.65	9.26
7	34.39	19.9	45.85	35.21	19.9	4.19	47.87	19.9	43.85	23.66	19.9	36.65	8.92
27	34.06	20.9	45.88	34.86	20.9	4.38	47.59	20.9	43.91	23.38	20.9	36.65	8.57
10	33.75	21.9	45.91	34.52	21.9	4.56	47.31	21.9	43.98	23.11	21.9	36.69	8.24
52	33.46	22.9	45.95	34.19	22.9	4.73	47.01	22.9	44.04	22.83	22.9	36.74	7.91
54	33.19	23.9	45.99	33.88	23.9	4.90	46.71	23.9	44.10	22.54	23.9	36.81	7.60
77	32.94	24.9	46.03	33.59	24.9	5.07	46.39	24.9	44.16	22.23	24.9	36.89	7.30
00	32.70	25.9	46.08	33.30	25.9	5.25	46.06	25.9	44.23	21.90	25.9	36.97	7.02
01	32.48	26.9	46.13	33.04	26.9	5.47	45.74	26.9	44.31	21.57	26.9	37.05	6.75
12	32.25	27.9	46.17	32.78	27.9	5.71	45.40	27.9	44.39	21.23	27.9	37.12	6.50
23	32.01	28.9	46.21	32.51	28.9	5.98	45.06	28.9	44.50	20.90	28.9	37.17	6.24
34	31.76	29.9	46.25	32.23	29.9	6.29	44.74	29.9	44.62	20.58	29.9	37.21	5.97
44	31.50	30.9	46.28	31.94	30.9	6.63	44.43	30.9	44.75	20.28	30.9	37.25	5.69
55	31.22	31.9	46.32	31.63	31.9	6.99	44.14	31.9	44.88	19.99	31.9	37.27	5.39
	−11.04		6.20	−6.12		20.33	+20.30		7.74	+7.67		18.51	−18.48
s	14s.756		6h 46m 58s.546			7h 2m 4s.048			7h 13m 42s.294			7h 16m 20s.292	
	46″.89		−80° 43′ 38″.16			+87° 10′ 54″.74			+82° 34′ 30″.13			−86° 54′ 6″.70	

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT .

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

...ntis. 6.3		Bradley 1672. Mag. 6.3			ι Octantis. Mag. 5.4			32 H. Camelop. seq. Mag. 5.3			κ Octantis. Mag. 5.6		
t ...	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
n	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
)	−84 9	July	12 14	+88 9	July	12 46	−84 40	July	12 48	+83 51	July	13 27	−85 22
	″		s	″		s	″		s	″		s	″
	24.93	1.2	27.53	39.67	1.3	12.01	59.23	1.3	32.30	54.24	1.3	25.17	17.98
	24.89	2.2	26.83	39.53	2.3	11.83	59.31	2.3	32.09	54.16	2.3	24.99	18.13
	24.85	3.2	26.17	39.37	3.3	11.65	59.40	3.3	31.89	54.07	3.3	24.80	18.29
	24.80	4.2	25.57	39.21	4.2	11.46	59.50	4.2	31.70	53.97	4.3	24.58	18.45
	24.75	5.2	25.01	39.07	5.2	11.24	59.58	5.2	31.53	53.86	5.3	24.35	18.59
	24.66	6.2	24.47	38.92	6.2	11.00	59.65	6.2	31.37	53.76	6.3	24.09	18.71
	24.52	7.2	23.93	38.80	7.2	10.77	59.68	7.2	31.20	53.68	7.3	23.83	18.81
	24.38	8.2	23.38	38.67	8.2	10.52	59.69	8.2	31.03	53.62	8.3	23.56	18.88
	24.23	9.2	22.78	38.57	9.2	10.30	59.68	9.2	30.85	53.57	9.3	23.31	18.92
	24.07	10.2	22.13	38.46	10.2	10.09	59.65	10.2	30.65	53.52	10.3	23.06	18.94
	23.92	11.2	21.43	38.34	11.2	9.90	59.62	11.2	30.43	53.46	11.3	22.84	18.97
	23.78	12.2	20.74	38.20	12.2	9.71	59.60	12.2	30.21	53.38	12.3	22.64	18.99
	23.68	13.2	20.02	38.03	13.2	9.55	59.59	13.2	29.99	53.28	13.3	22.45	19.03
	23.57	14.2	19.34	37.84	14.2	9.38	59.60	14.2	29.79	53.14	14.2	22.26	19.09
	23.44	15.2	18.68	37.64	15.2	9.20	59.61	15.2	29.59	53.00	15.2	22.06	19.15
	23.32	16.2	18.08	37.43	16.2	9.00	59.61	16.2	29.40	52.85	16.2	21.84	19.21
9	23.19	17.2	17.52	37.21	17.2	8.79	59.62	17.2	29.22	52.69	17.2	21.61	19.28
1	23.05	18.2	17.00	37.00	18.2	8.57	59.62	18.2	29.05	52.53	18.2	21.36	19.33
3	22.87	19.2	16.48	36.80	19.2	8.35	59.60	19.2	28.88	52.37	19.2	21.09	19.37
6	22.68	20.2	15.97	36.61	20.2	8.12	59.55	20.2	28.73	52.22	20.2	20.82	19.39
9	22.48	21.2	15.46	36.43	21.2	7.88	59.49	21.2	28.56	52.09	21.2	20.56	19.38
2	22.25	22.2	14.94	36.25	22.2	7.66	59.41	22.2	28.39	51.96	22.2	20.29	19.35
7	22.03	23.2	14.38	36.07	23.2	7.44	59.32	23.2	28.21	51.84	23.2	20.03	19.31
3	21.81	24.2	13.81	35.89	24.2	7.24	59.22	24.2	28.03	51.70	24.2	19.78	19.26
0	21.59	25.2	13.21	35.70	25.2	7.04	59.09	25.2	27.84	51.58	25.2	19.54	19.21
7	21.37	26.2	12.60	35.51	26.2	6.86	58.98	26.2	27.64	51.44	26.2	19.32	19.15
6	21.16	27.2	11.97	35.27	27.2	6.68	58.90	27.2	27.44	51.27	27.2	19.12	19.10
5	20.98	28.2	11.35	35.02	28.2	6.52	58.82	28.2	27.24	51.08	28.2	18.92	19.07
33	20.81	29.2	10.75	34.76	29.2	6.35	58.75	29.2	27.05	50.87	29.2	18.72	19.05
21	20.63	30.2	10.19	34.48	30.2	6.18	58.69	30.2	26.86	50.64	30.2	18.51	19.04
09	20.46	31.2	9.70	34.18	31.2	5.99	58.63	31.2	26.71	50.41	31.2	18.29	19.04
94	20.27	32.1	9.23	33.87	32.2	5.80	58.57	32.2	26.55	50.16	32.2	18.06	19.03
	−9.77		31.15	+31.14		10.79	−10.75		9.36	+9.30		12.39	−12.35
	$55^s.280$		$12^h\ 14^m\ 28^s.425$			$12^h\ 46^m\ 7^s.152$			$12^h\ 48^m\ 30^s.418$			$13^h\ 27^m\ 14^s.624$	
	$50''.60$		$+88°\ 9'\ 36''.08$			$-84°\ 40'\ 22''.34$			$+83°\ 51'\ 50''.47$			$-85°\ 21'\ 42''.23$	

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT .

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FOR THE UPPER TRANSIT AT WASHINGTON.

. Cephei. Mag. 4.5		α Ursæ Minoris. (Polaris.) Mag. 2.1			4 G. Octantis. Mag. 5.6			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4		
Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
0 57	+85 48	Aug.	1 30	+88 51	Aug.	1 42	−85 10	Aug.	4 10	+85 20	Aug.	5 35	+85 9
s	″		s	″		s	″		s	″		s	″
22.05	45.97	0.7	51.98	42.35	0.7	2.68	43.97	0.8	11.49	2.96	0.9	18.83	20.71
22.30	46.22	1.7	53.01	42.56	1.7	2.95	43.95	1.8	11.80	2.93	1.9	19.11	20.56
22.55	46.47	2.7	53.96	42.76	2.7	3.22	43.95	2.8	12.09	2.92	2.9	19.36	20.42
22.78	46.70	3.7	54.89	42.96	3.7	3.49	43.98	3.8	12.36	2.89	3.9	19.60	20.27
23.01	46.90	4.7	55.82	43.11	4.7	3.76	44.02	4.8	12.63	2.85	4.9	19.83	20.12
23.25	47.10	5.7	56.79	43.26	5.7	4.01	44.10	5.8	12.90	2.80	5.9	20.05	19.94
23.52	47.31	6.7	57.84	43.41	6.7	4.25	44.18	6.8	13.17	2.72	6.9	20.27	19.76
23.80	47.51	7.7	58.94	43.56	7.7	4.47	44.26	7.8	13.46	2.64	7.9	20.50	19.54
24.09	47.74	8.7	60.12	43.73	8.7	4.67	44.35	8.8	13.78	2.54	8.9	20.76	19.32
24.40	47.97	9.7	61.31	43.92	9.7	4.88	44.44	9.8	14.11	2.47	9.8	21.03	19.12
24.70	48.23	10.7	62.49	44.14	10.7	5.08	44.50	10.8	14.45	2.41	10.8	21.33	18.92
24.98	48.51	11.7	63.63	44.38	11.7	5.30	44.56	11.8	14.80	2.39	11.8	21.64	18.74
25.25	48.81	12.7	64.69	44.62	12.7	5.52	44.61	12.8	15.14	2.39	12.8	21.94	18.60
25.49	49.10	13.7	65.69	44.88	13.7	5.75	44.67	13.8	15.47	2.41	13.8	22.23	18.47
25.72	49.40	14.7	66.62	45.13	14.7	6.00	44.75	14.8	15.79	2.44	14.8	22.52	18.37
25.92	49.69	15.7	67.50	45.38	15.7	6.25	44.83	15.8	16.07	2.47	15.8	22.80	18.27
26.12	49.96	16.7	68.35	45.63	16.7	6.51	44.95	16.8	16.36	2.50	16.8	23.06	18.17
26.32	50.23	17.7	69.20	45.85	17.7	6.76	45.08	17.8	16.64	2.53	17.8	23.31	18.07
26.53	50.48	18.7	70.04	46.05	18.7	7.00	45.22	18.8	16.92	2.54	18.8	23.56	17.95
26.75	50.74	19.7	70.93	46.25	19.7	7.23	45.36	19.8	17.20	2.53	19.8	23.81	17.83
26.97	51.01	20.6	71.87	46.46	20.7	7.46	45.53	20.8	17.48	2.52	20.8	24.06	17.69
27.20	51.27	21.6	72.83	46.68	21.7	7.66	45.72	21.8	17.78	2.51	21.8	24.33	17.55
27.44	51.53	22.6	73.83	46.91	22.7	7.85	45.90	22.8	18.09	2.49	22.8	24.60	17.42
27.69	51.81	23.6	74.86	47.16	23.6	8.03	46.07	23.8	18.42	2.48	23.8	24.89	17.27
27.93	52.12	24.6	75.90	47.42	24.6	8.22	46.23	24.7	18.75	2.48	24.8	25.20	17.14
28.18	52.44	25.6	76.93	47.71	25.6	8.40	46.38	25.7	19.09	2.52	25.8	25.52	17.04
28.42	52.79	26.6	77.91	48.02	26.6	8.59	46.50	26.7	19.46	2.58	26.8	25.86	16.93
28.63	53.14	27.6	78.82	48.34	27.6	8.79	46.63	27.7	19.80	2.67	27.8	26.20	16.86
28.82	53.49	28.6	79.65	48.68	28.6	9.00	46.76	28.7	20.14	2.78	28.8	26.52	16.81
28.99	53.84	29.6	80.40	48.99	29.6	9.23	46.90	29.7	20.46	2.89	29.8	26.84	16.78
29.14	54.18	30.6	81.11	49.29	30.6	9.45	47.06	30.7	20.75	2.99	30.8	27.13	16.75
29.29	54.52	31.6	81.79	49.58	31.6	9.67	47.24	31.7	21.03	3.09	31.8	27.41	16.71
0	+13.66		50.38	+50.37		11.90	−11.86		12.29	+12.25		11.84	+11.80
57ᵐ 9ˢ.300		1ʰ 30ᵐ 13ˢ.156			1ʰ 42ᵐ 2ˢ.339			4ʰ 10ᵐ 2ˢ.561			5ʰ 35ᵐ 12ˢ.782		
48′ 45″.30		+88° 51′ 43″.55			−85° 11′ 21″.46			+85° 20′ 10″.34			+85° 9′ 30″.24		

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT .

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η Octantis. Mag. 6.3			Bradley 1672. Mag. 6.3			ι Octantis. Mag. 5.4			32 H. Camelop *seq.* Mag. 5.3			κ Octan[tis] Mag. 5[…]	
Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m
Aug.	10 59	−84 9	Aug.	12 13	+88 9	Aug.	12 46	−84 40	Aug.	12 48	+83 51	Aug.	13 27
	s	″		s	″		s	″		s	″		s
1.1	43.94	20.27	1.1	69.23	33.87	1.2	5.80	58.57	1.2	26.55	50.16	1.2	18.06
2.1	43.80	20.06	2.1	68.82	33.59	2.2	5.58	58.49	2.2	26.41	49.91	2.2	17.81
3.1	43.65	19.82	3.1	68.42	33.34	3.2	5.36	58.39	3.2	26.28	49.68	3.2	17.54
4.1	43.50	19.55	4.1	68.01	33.09	4.2	5.13	58.25	4.2	26.13	49.47	4.2	17.27
5.1	43.36	19.28	5.1	67.57	32.85	5.2	4.92	58.09	5.2	25.99	49.28	5.2	17.02
6.1	43.26	19.00	6.1	67.10	32.61	6.2	4.73	57.92	6.2	25.81	49.10	6.2	16.77
7.1	43.16	18.72	7.1	66.58	32.38	7.2	4.56	57.75	7.2	25.64	48.90	7.2	16.54
8.1	43.07	18.46	8.1	66.02	32.12	8.2	4.40	57.59	8.2	25.45	48.68	8.2	16.33
9.1	43.01	18.23	9.1	65.46	31.84	9.1	4.25	57.41	9.2	25.27	48.45	9.2	16.14
10.1	42.93	18.00	10.1	64.93	31.53	10.1	4.11	57.26	10.1	25.09	48.20	10.2	15.96
11.1	42.85	17.77	11.1	64.41	31.22	11.1	3.97	57.12	11.1	24.92	47.93	11.2	15.77
12.1	42.77	17.55	12.1	63.95	30.89	12.1	3.81	57.00	12.1	24.76	47.65	12.2	15.58
13.1	42.68	17.32	13.1	63.54	30.55	13.1	3.64	56.86	13.1	24.62	47.36	13.2	15.37
14.1	42.57	17.06	14.1	63.17	30.23	14.1	3.46	56.72	14.1	24.48	47.07	14.2	15.15
15.1	42.47	16.79	15.1	62.83	29.91	15.1	3.28	56.56	15.1	24.35	46.78	15.2	14.91
16.1	42.37	16.52	16.1	62.50	29.60	16.1	3.09	56.38	16.1	24.24	46.52	16.2	14.67
17.1	42.26	16.22	17.1	62.17	29.31	17.1	2.89	56.19	17.1	24.12	46.25	17.2	14.42
18.1	42.17	15.90	18.1	61.84	29.02	18.1	2.70	55.97	18.1	23.99	46.00	18.2	14.18
19.0	42.10	15.58	19.1	61.49	28.72	19.1	2.52	55.73	19.1	23.86	45.75	19.2	13.94
20.0	42.04	15.26	20.1	61.11	28.45	20.1	2.36	55.48	20.1	23.72	45.51	20.1	13.71
21.0	41.97	14.94	21.1	60.70	28.16	21.1	2.21	55.24	21.1	23.57	45.26	21.1	13.51
22.0	41.93	14.63	22.1	60.28	27.86	22.1	2.07	55.00	22.1	23.43	45.00	22.1	13.32
23.0	41.89	14.34	23.1	59.86	27.54	23.1	1.95	54.75	23.1	23.28	44.72	23.1	13.14
24.0	41.87	14.06	24.1	59.43	27.20	24.1	1.84	54.52	24.1	23.12	44.42	24.1	12.99
25.0	41.84	13.79	25.1	59.02	26.84	25.1	1.73	54.31	25.1	22.97	44.10	25.1	12.83
26.0	41.81	13.55	26.1	58.66	26.48	26.1	1.62	54.11	26.1	22.83	43.76	26.1	12.66
27.0	41.77	13.31	27.1	58.34	26.09	27.1	1.49	53.93	27.1	22.72	43.41	27.1	12.49
28.0	41.72	13.04	28.1	58.08	25.69	28.1	1.36	53.75	28.1	22.61	43.06	28.1	12.32
29.0	41.66	12.75	29.1	57.85	25.31	29.1	1.22	53.52	29.1	22.52	42.72	29.1	12.13
30.0	41.60	12.44	30.1	57.66	24.94	30.1	1.06	53.30	30.1	22.44	42.37	30.1	11.91
31.0	41.54	12.12	31.1	57.48	24.61	31.1	0.90	53.06	31.1	22.35	42.05	31.1	11.69
32.0	41.50	11.79	32.1	57.27	24.27	32.1	0.75	52.79	32.1	22.26	41.73	32.1	11.49
9.82		−9.77	31.12		+31.10	10.79		−10.74	9.35		+9.30	12.39	−
10^h	59^m	$55^s.280$	12^h	14^m	$28^s.425$	12^h	46^m	$7^s.152$	12^h	48^m	$30^s.418$	13^h	27^m
−84°	8′	50″.60	+88°	9′	36″.08	−84°	40′	22″.34	+83°	51′	50″.47	−85°	21′

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Octantis. Mag. 4.1			Groombridge 2283. Mag. 7.2			ρ Octantis. Mag. 5.7			ε Ursæ Minoris. Mag. 4.4			59 G. Apodis. Mag. 5.9		
[illegible]	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
[illegible]	14 13	−83 17	Aug.	15 3	+87 33	Aug.	15 24	−84 12	Aug.	16 54	+82 10	Aug.	17 16	−80 47
	s	″		s	″		s	″		s	″		s	″
[illegible]	35.28	56.67	1.3	29.26	16.12	1.3	11.88	1.94	1.3	25.58	42.50	1.4	10.90	25.20
[illegible]	35.12	56.73	2.3	28.73	16.05	2.3	11.70	2.07	2.3	25.42	42.61	2.4	10.82	25.45
[illegible]	34.94	56.72	3.3	28.23	15.98	3.3	11.50	2.18	3.3	25.28	42.70	3.4	10.75	25.69
[illegible]	34.75	56.69	4.3	27.74	15.94	4.3	11.30	2.28	4.3	25.13	42.82	4.4	10.66	25.92
[illegible]	34.56	56.67	5.3	27.23	15.91	5.3	11.08	2.34	5.3	24.99	42.96	5.3	10.56	26.11
[illegible]	34.39	56.61	6.3	26.72	15.90	6.3	10.88	2.38	6.3	24.84	43.11	6.3	10.45	26.28
[illegible]	34.22	56.52	7.3	26.16	15.89	7.3	10.69	2.38	7.3	24.69	43.27	7.3	10.36	26.42
[illegible]	34.08	56.43	8.2	25.59	15.88	8.3	10.51	2.38	8.3	24.52	43.45	8.3	10.26	26.55
[illegible]	33.93	56.37	9.2	24.99	15.85	9.3	10.34	2.38	9.3	24.36	43.63	9.3	10.17	26.67
[illegible]	33.79	56.32	10.2	24.37	15.81	10.3	10.18	2.41	10.3	24.19	43.77	10.3	10.09	26.79
[illegible]	33.66	56.27	11.2	23.76	15.72	11.3	10.03	2.45	11.3	24.00	43.90	11.3	10.02	26.93
[illegible]	33.53	56.22	12.2	23.16	15.63	12.3	9.88	2.50	12.3	23.83	44.01	12.3	9.95	27.11
[illegible]	33.39	56.18	13.2	22.58	15.53	13.2	9.70	2.54	13.3	23.65	44.11	13.3	9.87	27.27
[illegible]	33.22	56.15	14.2	22.03	15.41	14.2	9.52	2.58	14.3	23.49	44.19	14.3	9.79	27.45
[illegible]	33.05	56.11	15.2	21.51	15.29	15.2	9.32	2.63	15.3	23.32	44.24	15.3	9.69	27.63
[illegible]	32.87	56.02	16.2	21.00	15.18	16.2	9.13	2.66	16.3	23.15	44.29	16.3	9.59	27.81
[illegible]	32.70	55.95	17.2	20.51	15.08	17.2	8.90	2.67	17.3	23.00	44.35	17.3	9.48	27.95
[illegible]	32.51	55.82	18.2	20.01	14.98	18.2	8.68	2.67	18.3	22.85	44.41	18.3	9.35	28.10
[illegible]	32.32	55.70	19.2	19.51	14.89	19.2	8.46	2.65	19.3	22.68	44.49	19.3	9.22	28.23
[illegible]	32.16	55.57	20.2	19.01	14.81	20.2	8.25	2.61	20.3	22.51	44.57	20.3	9.10	28.33
[illegible]	32.01	55.42	21.2	18.48	14.72	21.2	8.05	2.55	21.3	22.35	44.66	21.3	8.97	28.42
[illegible]	31.86	55.25	22.2	17.93	14.65	22.2	7.85	2.50	22.3	22.18	44.76	22.3	8.85	28.50
[illegible]	31.72	55.09	23.2	17.35	14.57	23.2	7.66	2.43	23.3	22.01	44.86	23.3	8.75	28.56
[illegible]	31.59	54.94	24.2	16.76	14.46	24.2	7.49	2.36	24.3	21.82	44.95	24.3	8.64	28.62
[illegible]	31.45	54.80	25.2	16.16	14.32	25.2	7.33	2.29	25.3	21.64	45.01	25.3	8.54	28.69
[illegible]	31.34	54.69	26.2	15.57	14.17	26.2	7.17	2.26	26.3	21.45	45.06	26.3	8.46	28.77
[illegible]	31.21	54.59	27.2	15.00	13.98	27.2	7.01	2.24	27.3	21.26	45.08	27.3	8.37	28.86
[illegible]	31.07	54.47	28.2	14.44	13.79	28.2	6.84	2.22	28.3	21.07	45.08	28.3	8.27	28.99
[illegible]	30.92	54.38	29.2	13.93	13.58	29.2	6.67	2.19	29.3	20.89	45.06	29.3	8.18	29.11
[illegible]	30.76	54.24	30.2	13.45	13.38	30.2	6.46	2.15	30.3	20.71	45.03	30.3	8.05	29.21
[illegible]	30.60	54.11	31.2	12.98	13.18	31.2	6.24	2.10	31.3	20.54	45.00	31.3	7.93	29.32
[illegible]	30.43	53.95	32.2	12.52	13.00	32.2	6.02	2.01	32.3	20.37	45.00	32.3	7.80	29.39
8.57		−8.51	23.43		+23.41	9.90		−9.85	7.35		+7.28	6.25		−6.17
14^h	13^m	$27^s.793$	15^h	3^m	$41^s.175$	15^h	23^m	$56^s.594$	16^h	54^m	$25^s.488$	17^h	15^m	$54^s.896$
−83°	17′	21″.03	+87°	33′	10″.52	−84°	11′	30″.39	+82°	10′	32″.75	−80°	47′	6″.56

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Ursæ Minoris. Mag. 4.4			χ Octantis. Mag. 5.2			λ Ursæ Minoris. Mag. 6.6			σ Octantis. Mag. 5.5			76 Drac Mag.	
Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascen sion.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m
Aug.	17 58	+86 37	Aug.	18 7	−87 40	Aug.	19 2	+89 1	Aug.	19 30	−89 13	Aug.	20 4
	s	″		s	″		s	″		s	″		s
1.4	60.70	1.97	1.4	12.34	3.88	1.4	41.82	13.21	1.5	48.67	27.56	1.5	45.8
2.4	60.37	2.17	2.4	12.14	4.17	2.4	40.92	13.48	2.4	48.61	27.88	2.5	45.7
3.4	60.06	2.36	3.4	11.90	4.47	3.4	40.06	13.72	3.4	48.42	28.21	3.5	45.7
4.4	59.77	2.55	4.4	11.62	4.76	4.4	39.28	13.99	4.4	48.09	28.54	4.5	45.7
5.4	59.49	2.77	5.4	11.29	5.01	5.4	38.54	14.25	5.4	47.65	28.84	5.5	45.7
6.4	59.21	2.99	6.4	10.95	5.25	6.4	37.82	14.52	6.4	47.09	29.13	6.5	45.6
7.4	58.90	3.23	7.4	10.61	5.44	7.4	37.09	14.84	7.4	46.51	29.40	7.5	45.6
8.4	58.59	3.47	8.4	10.28	5.64	8.4	36.32	15.16	8.4	45.93	29.65	8.5	45.6
9.4	58.27	3.73	9.4	10.00	5.82	9.4	35.44	15.49	9.4	45.43	29.89	9.5	45.6
10.4	57.90	3.97	10.4	9.72	6.00	10.4	34.49	15.81	10.4	44.98	30.13	10.5	45.6
11.4	57.53	4.21	11.4	9.47	6.20	11.4	33.46	16.10	11.4	44.59	30.38	11.5	45.5
12.4	57.16	4.41	12.4	9.21	6.42	12.4	32.37	16.40	12.4	44.22	30.65	12.5	45.5
13.4	56.77	4.58	13.4	8.94	6.66	13.4	31.26	16.66	13.4	43.85	30.93	13.5	45.4
14.4	56.40	4.74	14.4	8.64	6.89	14.4	30.17	16.89	14.4	43.42	31.22	14.5	45.4
15.4	56.03	4.89	15.4	8.32	7.13	15.4	29.08	17.12	15.4	42.92	31.52	15.5	45.3
16.3	55.68	5.03	16.4	7.96	7.38	16.4	28.05	17.34	16.4	42.32	31.82	16.5	45.2
17.3	55.34	5.18	17.4	7.58	7.61	17.4	27.05	17.57	17.4	41.62	32.12	17.5	45.2
18.3	55.01	5.33	18.3	7.16	7.82	18.4	26.08	17.80	18.4	40.82	32.42	18.5	45.1
19.3	54.67	5.50	19.3	6.72	8.02	19.4	25.14	18.04	19.4	39.95	32.69	19.5	45.1
20.3	54.33	5.68	20.3	6.28	8.20	20.4	24.20	18.28	20.4	39.02	32.95	20.5	45.0
21.3	54.00	5.87	21.3	5.84	8.35	21.4	23.23	18.55	21.4	38.05	33.19	21.5	45.0
22.3	53.63	6.06	22.3	5.40	8.50	22.4	22.24	18.83	22.4	37.10	33.42	22.4	44.9
23.3	53.27	6.24	23.3	4.98	8.66	23.4	21.19	19.10	23.4	36.15	33.66	23.4	44.9
24.3	52.87	6.43	24.3	4.59	8.79	24.4	20.06	19.37	24.4	35.28	33.85	24.4	44.8
25.3	52.46	6.61	25.3	4.22	8.90	25.4	18.84	19.64	25.4	34.46	34.04	25.4	44.7
26.3	52.03	6.76	26.3	3.88	9.05	26.4	17.55	19.89	26.4	33.72	34.26	26.4	44.7
27.3	51.60	6.90	27.3	3.55	9.20	27.4	16.21	20.12	27.4	33.03	34.48	27.4	44.6
28.3	51.17	7.00	28.3	3.19	9.38	28.4	14.85	20.31	28.4	32.33	34.72	28.4	44.5
29.3	50.74	7.08	29.3	2.82	9.56	29.4	13.48	20.51	29.4	31.57	35.00	29.4	44.4
30.3	50.33	7.14	30.3	2.41	9.74	30.4	12.19	20.68	30.4	30.71	35.26	30.4	44.3
31.3	49.94	7.22	31.3	1.94	9.91	31.3	10.95	20.85	31.4	29.71	35.52	31.4	44.2
32.3	49.56	7.31	32.3	1.45	10.06	32.3	9.78	21.02	32.4	28.60	35.77	32.4	44.1
16.95		+16.92	24.58		−24.56	58.55		+58.54	73.97		−73.97	7.40	
17^h	59^m	$1^s.307$	18^h	6^m	$11^s.893$	19^h	2^m	$39^s.624$	19^h	27^m	$42^s.218$	20^h	48^m
+86°	36′	51″.17	−87°	39′	51″.82	+89°	1′	2″.17	−89°	13′	28″.57	+82°	13′

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT .

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			*α* Ursæ Minoris. (*Polaris.*) Mag. 2.1			4 G. Octantis. Mag. 5.6			Groombridge 750. Mag. 6.7			Groomb Mag.	
Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascen- sion.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m
Sept.	0 57	+85 48	Sept.	1 31	+88 51	Sept.	1 42	−85 10	Sept.	4 10	+85 20	Sept.	5 35
	s	″		s	″		s	″		s	″		s
0.6	29.29	54.52	0.6	21.79	49.58	0.6	9.67	47.24	0.7	21.03	3.09	0.8	27.41
1.6	29.44	54.82	1.6	22.51	49.86	1.6	9.87	47.47	1.7	21.31	3.17	1.8	27.6
2.6	29.62	55.11	2.6	23.28	50.12	2.6	10.06	47.70	2.7	21.59	3.23	2.8	27.9
3.6	29.81	55.42	3.6	24.11	50.38	3.6	10.24	47.95	3.7	21.90	3.28	3.8	28.2
4.6	30.01	55.73	4.6	25.00	50.66	4.6	10.39	48.19	4.7	22.21	3.32	4.8	28.5
5.6	30.24	56.05	5.6	25.94	50.94	5.6	10.52	48.42	5.7	22.54	3.36	5.8	28.8
6.6	30.44	56.41	6.6	26.85	51.26	6.6	10.66	48.65	6.7	22.88	3.44	6.8	29.1
7.6	30.65	56.77	7.6	27.74	51.57	7.6	10.80	48.85	7.7	23.22	3.53	7.8	29.5
8.6	30.83	57.15	8.6	28.56	51.92	8.6	10.96	49.06	8.7	23.57	3.65	8.8	29.8
9.6	30.99	57.53	9.6	29.30	52.28	9.6	11.13	49.25	9.7	23.91	3.78	9.8	30.1
10.6	31.13	57.90	10.6	29.97	52.65	10.6	11.30	49.45	10.7	24.22	3.93	10.8	30.5
11.6	31.25	58.27	11.6	30.57	53.00	11.6	11.47	49.66	11.7	24.51	4.09	11.8	30.8
12.6	31.36	58.64	12.6	31.12	53.34	12.6	11.65	49.90	12.7	24.81	4.24	12.8	31.1
13.6	31.46	58.98	13.6	31.68	53.67	13.6	11.83	50.16	13.7	25.08	4.39	13.8	31.4
14.6	31.57	59.32	14.6	32.22	53.98	14.6	11.98	50.43	14.7	25.35	4.53	14.8	31.6
15.6	31.67	59.65	15.6	32.78	54.30	15.6	12.14	50.72	15.7	25.61	4.67	15.7	31.9
16.6	31.80	59.97	16.6	33.37	54.58	16.6	12.28	51.01	16.7	25.88	4.78	16.7	32.2
17.5	31.93	60.30	17.6	34.00	54.86	17.6	12.41	51.31	17.7	26.16	4.89	17.7	32.5
18.5	32.06	60.64	18.6	34.65	55.17	18.6	12.51	51.61	18.7	26.45	4.99	18.7	32.8
19.5	32.20	60.98	19.6	35.35	55.49	19.6	12.61	51.91	19.7	26.75	5.12	19.7	33.1
20.5	32.35	61.35	20.6	36.06	55.83	20.6	12.71	52.19	20.7	27.06	5.24	20.7	33.4
21.5	32.50	61.72	21.6	36.77	56.19	21.6	12.79	52.48	21.7	27.38	5.38	21.7	33.7
22.5	32.64	62.13	22.6	37.41	56.56	22.6	12.88	52.73	22.7	27.72	5.56	22.7	34.1
23.5	32.75	62.54	23.6	38.00	56.97	23.6	12.98	52.97	23.7	28.05	5.75	23.7	34.4
24.5	32.84	62.95	24.6	38.51	57.39	24.6	13.08	53.21	24.7	28.35	5.98	24.7	34.8
25.5	32.90	63.36	25.6	38.95	57.78	25.6	13.21	53.46	25.7	28.64	6.20	25.7	35.1
26.5	32.96	63.75	26.5	39.29	58.16	26.6	13.33	53.73	26.7	28.93	6.42	26.7	35.4
27.5	33.00	64.13	27.5	39.62	58.53	27.6	13.46	54.00	27.7	29.17	6.65	27.7	35.7
28.5	33.04	64.50	28.5	39.95	58.87	28.5	13.56	54.30	28.7	29.42	6.85	28.7	36.0
29.5	33.10	64.84	29.5	40.33	59.22	29.5	13.66	54.63	29.7	29.66	7.04	29.7	36.2
30.5	33.17	65.18	30.5	40.77	59.54	30.5	13.73	54.95	30.6	29.93	7.21	30.7	36.5
31.5	33.26	65.54	31.5	41.26	59.86	31.5	13.78	55.29	31.6	30.19	7.37	31.7	36.8
13.71		+13.67	50.49		+50.48	11.90		−11.86	12.29		+12.25	11.84	+
0^h	57^m	$9^s.300$	1^h	30^m	$13^s.156$	1^h	42^m	$2^s.339$	4^h	10^m	$2^s.561$	5^h	35^m
+85°	48′	45″.30	+88°	51′	43″.55	−85°	11′	21″.46	+85°	20′	10″.34	+85°	9′

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

Mensæ. g. 6.2		ζ Mensæ. Mag. 5.6			51 H. Cephei. Mag. 5.3			25 H. Camelop. Mag. 5.1			7 G. Octantis. Mag. 6.4		
ight cen- on.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.	Wash. Mean Time.	Right Ascen- sion.	Decli- nation.
m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
45	−84 49	Sept.	6 46	−80 43	Sept.	7 2	+87 10	Sept.	7 13	+82 34	Sept.	7 15	−86 53
s	″		s	″		s	″		s	″		s	″
.15	25.32	0.8	48.84	23.95	0.8	18.39	36.45	0.9	49.16	12.18	0.9	43.10	57.26
.38	25.21	1.8	48.96	23.75	1.8	18.79	36.27	1.9	49.31	11.99	1.9	43.41	57.02
.62	25.10	2.8	49.08	23.58	2.8	19.18	36.07	2.9	49.46	11.79	2.9	43.74	56.82
.86	25.05	3.8	49.20	23.44	3.8	19.58	35.86	3.8	49.61	11.57	3.9	44.08	56.63
.09	25.00	4.8	49.32	23.33	4.8	20.00	35.65	4.8	49.76	11.33	4.8	44.41	56.48
.31	24.97	5.8	49.45	23.22	5.8	20.45	35.42	5.8	49.93	11.09	5.8	44.73	56.34
.51	24.93	6.8	49.56	23.11	6.8	20.93	35.20	6.8	50.12	10.84	6.8	45.03	56.21
.72	24.89	7.8	49.67	22.99	7.8	21.43	34.99	7.8	50.30	10.61	7.8	45.32	56.07
.93	24.83	8.8	49.77	22.86	8.8	21.95	34.79	8.8	50.50	10.41	8.8	45.61	55.91
.13	24.75	9.8	49.88	22.72	9.8	22.47	34.63	9.8	50.71	10.24	9.8	45.89	55.74
.36	24.67	10.8	50.00	22.56	10.8	22.99	34.48	10.8	50.91	10.09	10.8	46.19	55.56
.58	24.58	11.8	50.13	22.39	11.8	23.49	34.35	11.8	51.10	9.94	11.8	46.50	55.37
.82	24.49	12.8	50.25	22.23	12.8	23.97	34.23	12.8	51.28	9.80	12.8	46.82	55.18
.07	24.43	13.8	50.38	22.08	13.8	24.43	34.11	13.8	51.45	9.67	13.8	47.18	55.00
.32	24.38	14.8	50.50	21.94	14.8	24.88	33.99	14.8	51.63	9.54	14.8	47.54	54.83
1.57	24.37	15.8	50.64	21.83	15.8	25.32	33.86	15.8	51.79	9.40	15.8	47.92	54.67
1.82	24.35	16.8	50.78	21.73	16.8	25.76	33.73	16.8	51.95	9.24	16.8	48.31	54.52
2.08	24.36	17.8	50.92	21.66	17.8	26.20	33.58	17.8	52.12	9.07	17.8	48.70	54.41
2.33	24.40	18.8	51.05	21.60	18.8	26.65	33.43	18.8	52.29	8.90	18.8	49.10	54.31
2.57	24.44	19.8	51.19	21.57	19.8	27.12	33.27	19.8	52.46	8.72	19.8	49.49	54.22
2.80	24.48	20.8	51.32	21.54	20.8	27.61	33.11	20.8	52.65	8.54	20.8	49.86	54.16
3.02	24.52	21.8	51.46	21.50	21.8	28.15	32.95	21.8	52.85	8.37	21.8	50.21	54.09
3.23	24.56	22.8	51.58	21.46	22.8	28.70	32.81	22.8	53.06	8.21	22.8	50.55	54.01
3.45	24.59	23.8	51.70	21.41	23.8	29.27	32.70	23.8	53.28	8.07	23.8	50.88	53.93
3.66	24.60	24.8	51.83	21.34	24.8	29.85	32.61	24.8	53.51	7.97	24.8	51.21	53.84
3.88	24.60	25.8	51.95	21.26	25.8	30.41	32.55	25.8	53.73	7.88	25.8	51.54	53.72
4.11	24.60	26.8	52.07	21.18	26.8	30.94	32.50	26.8	53.93	7.81	26.8	51.90	53.61
4.35	24.61	27.8	52.21	21.12	27.8	31.46	32.45	27.8	54.13	7.74	27.8	52.28	53.50
4.61	24.65	28.8	52.34	21.07	28.8	31.93	32.39	28.8	54.31	7.67	28.8	52.69	53.40
4.86	24.72	29.8	52.49	21.05	29.8	32.40	32.32	29.8	54.49	7.58	29.8	53.10	53.35
5.11	24.81	30.8	52.63	21.06	30.8	32.86	32.24	30.8	54.66	7.47	30.8	53.54	53.30
5.35	24.94	31.8	52.78	21.10	31.8	33.35	32.13	31.8	54.84	7.35	31.8	53.97	53.30
	−11.04		6.20	−6.12		20.30	+20.27		7.73	+7.67		18.48	−18.45
6m	14s.756		6h 46m	58s.546		7h 2m	4s.048		7h 13m	42s.294		7h 16m	20s.292
9′	46″.89		−80° 43′	38″.16		+87° 10′	54″.74		+82° 34′	30″.13		−86° 54′	6″.70

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

ctantis. Mag. 6.3		Bradley 1672. Mag. 6.3			ι Octantis. Mag. 5.4			32 H. Camelop. *seq.* Mag. 5.3			κ Octantis. Mag. 5.6		
Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination	Wash. Mean Time.	Right Ascension.	Declination.	Wash Mean Time.	Right Ascension.	Declination.
h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
0 59	−84 9	Sept.	12 13	+88 9	Sept.	12 45	−84 40	Sept.	12 48	+83 51	Sept.	13 27	−85 22
s	″		s	″		s	″		s	″		s	″
1.50	11.79	1.1	57.27	24.27	1.1	60.75	52.79	1.1	22.26	41.73	1.1	11.49	14.66
1.46	11.46	2.1	57.04	23.94	2.1	60.61	52.51	2.1	22.16	41.44	2.1	11.30	14.42
1.46	11.12	3.1	56.75	23.63	3.1	60.50	52.22	3.1	22.03	41.14	3.1	11.13	14.14
1.48	10.80	4.1	56.42	23.29	4.1	60.41	51.93	4.1	21.91	40.83	4.1	10.98	13.87
1.49	10.50	5.1	56.09	22.94	5.1	60.34	51.65	5.1	21.79	40.51	5.1	10.85	13.63
1.51	10.21	6.1	55.76	22.57	6.1	60.28	51.39	6.1	21.67	40.17	6.1	10.75	13.40
1.54	9.93	7.0	55.47	22.18	7.1	60.21	51.14	7.1	21.56	39.81	7.1	10.64	13.17
1.56	9.66	8.0	55.23	21.78	8.1	60.13	50.90	8.1	21.45	39.43	8.1	10.51	12.94
1.56	9.38	9.0	55.03	21.37	9.1	60.05	50.67	9.1	21.36	39.05	9.1	10.38	12.72
1.56	9.10	10.0	54.89	20.97	10.1	59.96	50.42	10.1	21.28	38.66	10.1	10.24	12.51
1.56	8.82	11.0	54.77	20.58	11.1	59.86	50.15	11.1	21.22	38.29	11.1	10.09	12.29
1.56	8.51	12.0	54.68	20.21	12.1	59.76	49.88	12.1	21.17	37.93	12.1	9.93	12.04
1.55	8.17	13.0	54.60	19.85	13.1	59.65	49.59	13.1	21.11	37.59	13.1	9.77	11.78
1.55	7.84	14.0	54.51	19.49	14.1	59.55	49.27	14.1	21.05	37.25	14.1	9.61	11.50
1.58	7.49	15.0	54.41	19.15	15.0	59.46	48.96	15.0	20.99	36.91	15.1	9.46	11.21
1.62	7.15	16.0	54.28	18.81	16.0	59.38	48.64	16.0	20.92	36.58	16.1	9.32	10.91
1.66	6.82	17.0	54.13	18.47	17.0	59.32	48.29	17.0	20.84	36.27	17.1	9.21	10.59
1.71	6.49	18.0	53.97	18.11	18.0	59.28	47.95	18.0	20.75	35.95	18.1	9.10	10.27
1.78	6.17	19.0	53.79	17.74	19.0	59.25	47.62	19.0	20.67	35.61	19.1	9.00	9.96
1.86	5.87	20.0	53.61	17.37	20.0	59.23	47.30	20.0	20.59	35.24	20.1	8.94	9.67
1.94	5.59	21.0	53.46	16.98	21.0	59.21	47.01	21.0	20.51	34.86	21.1	8.88	9.37
2.00	5.31	22.0	53.33	16.57	22.0	59.20	46.73	22.0	20.45	34.47	22.1	8.83	9.09
2.07	5.06	23.0	53.25	16.16	23.0	59.19	46.46	23.0	20.39	34.07	23.1	8.77	8.85
2.14	4.81	24.0	53.22	15.72	24.0	59.15	46.21	24.0	20.35	33.65	24.1	8.69	8.61
2.19	4.54	24.9	53.25	15.28	25.0	59.11	45.95	25.0	20.32	33.23	25.0	8.60	8.37
2.23	4.26	25.9	53.29	14.87	26.0	59.07	45.67	26.0	20.31	32.82	26.0	8.51	8.10
2.28	3.98	26.9	53.38	14.49	27.0	59.02	45.34	27.0	20.30	32.44	27.0	8.41	7.82
2.34	3.65	27.9	53.44	14.12	28.0	58.97	45.03	28.0	20.29	32.07	28.0	8.31	7.50
12.41	3.33	28.9	53.49	13.75	29.0	58.94	44.70	29.0	20.26	31.71	29.0	8.21	7.17
12.50	3.01	29.9	53.48	13.42	30.0	58.93	44.35	30.0	20.23	31.37	30.0	8.16	6.83
12.60	2.69	30.9	53.44	13.06	31.0	58.94	43.99	31.0	20.19	31.02	31.0	8.12	6.47
12.74	2.41	31.9	53.39	12.70	32.0	58.97	43.65	32.0	20.14	30.66	32.0	8.11	6.12
	−9.76		31.06	+31.05		10.79	−10.74		9.35	+9.30		12.39	−12.35
9m 55s.280			12h 14m 28s.425			12h 46m 7s.152			12h 48m 30s.418			13h 27m 14s.624	
8′ 50″.60			+88° 9′ 36″.08			−84° 40′ 22″.34			+83° 51′ 50″.47			−85° 21′ 42″.23	

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

λ Octantis. Mag. 5.4		
Wash. Mean Time.	Right Ascension.	Declination.
	h m	° ′
Sept.	21 38	−83 5
	s	″
1.5	40.33	54.55
2.5	40.29	54.87
3.5	40.23	55.17
4.4	40.16	55.44
5.4	40.10	55.70
6.4	40.05	55.94
7.4	40.00	56.17
8.4	39.96	56.41
9.4	39.93	56.68
10.4	39.89	56.95
11.4	39.85	57.23
12.4	39.80	57.54
13.4	39.75	57.85
14.4	39.67	58.17
15.4	39.58	58.48
16.4	39.49	58.77
17.4	39.39	59.06
18.4	39.28	59.32
19.4	39.17	59.57
20.4	39.06	59.81
21.4	38.96	60.01
22.4	38.87	60.22
23.4	38.80	60.44
24.4	38.72	60.67
25.4	38.65	60.91
26.4	38.56	61.17
27.4	38.47	61.43
28.4	38.37	61.69
29.4	38.24	61.95
30.4	38.10	62.19
31.4	37.96	62.42
32.4	37.82	62.62
	8.32	−8.26
	21^h 38^m $19^s.542$	
	$-83°$ $6'$ $6''.99$	

υ Octantis. Mag. 5.7		
Wash. Mean Time.	Right Ascension.	Declination.
	h m	° ′
Sept.	22 16	−86 23
	s	″
1.5	43.00	10.03
2.5	42.97	10.36
3.5	42.91	10.68
4.5	42.82	10.97
5.5	42.73	11.25
6.5	42.67	11.52
7.5	42.61	11.76
8.5	42.57	12.03
9.5	42.54	12.30
10.5	42.52	12.59
11.5	42.49	12.89
12.5	42.44	13.21
13.4	42.39	13.53
14.4	42.30	13.86
15.4	42.20	14.19
16.4	42.07	14.52
17.4	41.92	14.82
18.4	41.75	15.12
19.4	41.59	15.39
20.4	41.42	15.67
21.4	41.27	15.91
22.4	41.13	16.15
23.4	41.01	16.40
24.4	40.91	16.64
25.4	40.80	16.90
26.4	40.70	17.18
27.4	40.56	17.49
28.4	40.40	17.78
29.4	40.21	18.07
30.4	40.00	18.35
31.4	39.75	18.60
32.4	39.51	18.83
	15.87	−15.84
	22^h 16^m $8^s.656$	
	$-86°$ $23'$ $27''.13$	

β Octantis. Mag. 4.3		
Wash. Mean Time.	Right Ascension.	Declination.
	h m	° ′
Sept.	22 37	−81 48
	s	″
1.5	55.14	42.02
2.5	55.14	42.35
3.5	55.14	42.66
4.5	55.12	42.95
5.5	55.10	43.23
6.5	55.08	43.48
7.5	55.07	43.75
8.5	55.08	44.01
9.5	55.08	44.28
10.5	55.09	44.56
11.5	55.09	44.86
12.5	55.08	45.17
13.5	55.07	45.49
14.5	55.05	45.82
15.5	55.01	46.15
16.5	54.97	46.48
17.5	54.92	46.80
18.5	54.87	47.10
19.4	54.81	47.39
20.4	54.75	47.67
21.4	54.70	47.93
22.4	54.65	48.17
23.4	54.61	48.41
24.4	54.59	48.67
25.4	54.56	48.94
26.4	54.52	49.22
27.4	54.48	49.53
28.4	54.43	49.83
29.4	54.35	50.15
30.4	54.27	50.44
31.4	54.18	50.72
32.4	54.09	50.97
	7.02	−6.95
	22^h 37^m $39^s.016$	
	$-81°$ $49'$ $2''.34$	

39 H. Cephei. Mag. 5.6		
Wash. Mean Time.	Right Ascension.	Declination.
	h m	° ′
Sept.	23 28	+86 51
	s	″
1.5	4.04	14.66
2.5	4.12	14.99
3.5	4.22	15.35
4.5	4.33	15.71
5.5	4.43	16.09
6.5	4.53	16.51
7.5	4.62	16.91
8.5	4.66	17.33
9.5	4.67	17.74
10.5	4.68	18.14
11.5	4.65	18.53
12.5	4.62	18.91
13.5	4.59	19.28
14.5	4.56	19.63
15.5	4.55	19.99
16.5	4.54	20.32
17.5	4.55	20.67
18.5	4.56	21.03
19.5	4.57	21.42
20.5	4.59	21.82
21.5	4.59	22.23
22.5	4.56	22.65
23.5	4.52	23.08
24.5	4.44	23.50
25.5	4.33	23.91
26.5	4.20	24.31
27.5	4.08	24.67
28.5	3.97	25.03
29.5	3.87	25.37
30.5	3.80	25.71
31.4	3.74	26.06
32.4	3.69	26.44
	18.23	+18.20
	23^h 27^m $44^s.125$	
	$+86°$ $50'$ $58''.89$	

γ¹ O… Ma…	
Wash. Mean Time.	R… A…
	h
Sept.	2…
1.5	30
2.5	30
3.5	30
4.5	30
5.5	30
6.5	30
7.5	30
8.5	30
9.5	30
10.5	30
11.5	30
12.5	30
13.5	30
14.5	30
15.5	30
16.5	30
17.5	30
18.5	30
19.5	30
20.5	30
21.5	30
22.5	30
23.5	30
24.5	30
25.5	30
26.5	30
27.5	30
28.5	30
29.5	30
30.5	30
31.5	30
32.5	30
7.63	
23^h 4…	
$-82°$ 2…	

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

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FOR THE UPPER TRANSIT AT WASHINGTON.

ridge 1119. g. 7.0		ζ Octantis. Mag. 5.4			1 H. Draconis. Mag. 4.6			ζ Chamæleontis. Mag. 5.2			30 H. Camelop. Mag. 5.3		
Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
8 16	+88 52	Oct.	9 8	−85 19	Oct.	9 25	+81 41	Oct.	9 36	−80 34	Oct.	10 21	+82 58
s	″		s	″		s	″		s	″		s	″
8.08	32.77	0.9	38.57	56.89	0.9	25.86	13.14	0.9	14.57	9.04	0.9	5.23	25.86
9.09	32.55	1.9	38.81	56.70	1.9	25.97	12.86	1.9	14.68	8.83	1.9	5.31	25.52
0.15	32.33	2.8	39.06	56.56	2.9	26.08	12.55	2.9	14.80	8.64	2.9	5.40	25.16
1.30	32.10	3.8	39.30	56.43	3.9	26.20	12.22	3.9	14.91	8.49	3.9	5.49	24.80
2.52	31.88	4.8	39.53	56.31	4.9	26.34	11.91	4.9	15.02	8.35	4.9	5.62	24.43
3.80	31.68	5.8	39.74	56.18	5.9	26.49	11.62	5.9	15.13	8.19	5.9	5.75	24.06
5.11	31.50	6.8	39.95	56.05	6.9	26.64	11.33	6.9	15.23	8.02	6.9	5.89	23.72
6.44	31.35	7.8	40.16	55.90	7.8	26.81	11.07	7.9	15.33	7.85	7.9	6.03	23.38
7.75	31.21	8.8	40.36	55.72	8.8	26.96	10.83	8.9	15.43	7.67	8.9	6.18	23.07
9.02	31.09	9.8	40.58	55.55	9.8	27.12	10.59	9.9	15.53	7.48	9.9	6.32	22.77
0.24	30.99	10.8	40.80	55.39	10.8	27.26	10.37	10.8	15.64	7.29	10.9	6.46	22.48
1.42	30.88	11.8	41.04	55.23	11.8	27.41	10.17	11.8	15.74	7.09	11.9	6.60	22.20
2.55	30.76	12.8	41.29	55.07	12.8	27.54	9.97	12.8	15.87	6.89	12.9	6.73	21.93
3.67	30.63	13.8	41.56	54.92	13.8	27.67	9.75	13.8	15.99	6.71	13.9	6.85	21.67
4.76	30.51	14.8	41.83	54.80	14.8	27.80	9.53	14.8	16.12	6.57	14.9	6.96	21.40
5.87	30.39	15.8	42.11	54.69	15.8	27.93	9.30	15.8	16.25	6.43	15.9	7.08	21.12
17.00	30.25	16.8	42.38	54.59	16.8	28.06	9.06	16.8	16.39	6.32	16.9	7.20	20.81
18.18	30.10	17.8	42.67	54.53	17.8	28.19	8.82	17.8	16.53	6.22	17.9	7.32	20.49
19.42	29.94	18.8	42.94	54.48	18.8	28.34	8.57	18.8	16.66	6.13	18.9	7.46	20.17
0.74	29.79	19.8	43.20	54.43	19.8	28.52	8.32	19.8	16.79	6.06	19.9	7.60	19.85
52.12	29.67	20.8	43.44	54.38	20.8	28.68	8.08	20.8	16.92	5.99	20.8	7.78	19.53
53.53	29.57	21.8	43.67	54.33	21.8	28.85	7.85	21.8	17.04	5.91	21.8	7.96	19.23
54.95	29.50	22.8	43.90	54.25	22.8	29.04	7.64	22.8	17.16	5.82	22.8	8.14	18.94
56.33	29.44	23.8	44.14	54.17	23.8	29.22	7.46	23.8	17.27	5.71	23.8	8.32	18.70
57.66	29.40	24.8	44.37	54.08	24.8	29.40	7.31	24.8	17.39	5.61	24.8	8.50	18.45
58.90	29.36	25.8	44.64	53.99	25.8	29.55	7.16	25.8	17.51	5.50	25.8	8.66	18.22
60.08	29.32	26.8	44.92	53.92	26.8	29.70	7.00	26.8	17.64	5.38	26.8	8.81	18.00
61.22	29.27	27.8	45.21	53.87	27.8	29.85	6.82	27.8	17.78	5.30	27.8	8.95	17.78
62.34	29.19	28.8	45.51	53.84	28.8	29.98	6.65	28.8	17.94	5.25	28.8	9.09	17.54
63.50	29.11	29.8	45.81	53.85	29.8	30.12	6.46	29.8	18.08	5.21	29.8	9.24	17.27
64.72	29.02	30.8	46.11	53.89	30.8	30.29	6.25	30.8	18.24	5.21	30.8	9.38	16.99
66.01	28.92	31.8	46.39	53.92	31.8	30.46	6.05	31.8	18.39	5.23	31.8	9.55	16.71
4	+50.93		12.29	−12.25		6.91	+6.84		6.10	−6.02		8.17	+8.11
15^m	48^s.380	9^h	8^m	57^s.938	9^h	25^m	21^s.719	9^h	36^m	22^s.347	10^h	21^m	4^s.831
53′	0″.29	−85°	19′	57″.45	+81°	41′	41″.50	−80°	34′	6″.83	+82°	58′	54″.07

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT .

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

Octantis. Mag. 4.1		Groombridge 2283. Mag. 7.2			ρ Octantis. Mag. 5.7			ε Ursæ Minoris. Mag. 4.4			59 G. Apodis. Mag. 5.9		
Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
14 13	−83 17	Oct.	15 2	+87 32	Oct.	15 23	−84 11	Oct.	16 54	+82 10	Oct.	17 16	−80 47
s	″		s	″		s	″		s	″		s	″
27.27	46.80	1.1	58.66	66.01	1.1	61.12	56.95	1.2	15.05	43.06	1.2	4.14	28.48
27.22	46.47	2.1	58.24	65.76	2.1	61.01	56.67	2.2	14.88	42.96	2.2	4.02	28.31
27.19	46.15	3.1	57.79	65.50	3.1	60.91	56.38	3.2	14.70	42.86	3.2	3.92	28.14
27.16	45.87	4.1	57.34	65.21	4.1	60.82	56.12	4.2	14.51	42.74	4.2	3.82	28.00
27.14	45.61	5.1	56.92	64.91	5.1	60.73	55.88	5.2	14.33	42.59	5.2	3.73	27.85
27.11	45.33	6.1	56.50	64.58	6.1	60.65	55.66	6.2	14.16	42.42	6.2	3.65	27.72
27.07	45.05	7.1	56.13	64.21	7.1	60.56	55.43	7.2	13.98	42.23	7.2	3.56	27.60
27.03	44.80	8.1	55.80	63.85	8.1	60.44	55.21	8.2	13.81	42.01	8.2	3.46	27.50
26.98	44.53	9.1	55.48	63.51	9.1	60.32	54.98	9.2	13.65	41.79	9.2	3.34	27.39
26.92	44.23	10.1	55.20	63.19	10.1	60.20	54.74	10.2	13.50	41.58	10.2	3.22	27.26
26.86	43.91	11.1	54.92	62.87	11.1	60.08	54.47	11.1	13.35	41.38	11.2	3.10	27.13
26.81	43.61	12.1	54.66	62.53	12.1	59.96	54.20	12.1	13.21	41.18	12.2	2.98	26.98
26.76	43.28	13.1	54.39	62.21	13.1	59.84	53.92	13.1	13.06	40.98	13.2	2.86	26.80
26.73	42.95	14.1	54.11	61.94	14.1	59.74	53.60	14.1	12.92	40.80	14.2	2.73	26.60
26.70	42.61	15.1	53.80	61.65	15.1	59.64	53.28	15.1	12.77	40.63	15.2	2.62	26.39
26.69	42.26	16.1	53.50	61.37	16.1	59.56	52.94	16.1	12.62	40.47	16.2	2.52	26.17
26.69	41.92	17.1	53.18	61.05	17.1	59.50	52.62	17.1	12.47	40.30	17.1	2.41	25.94
26.71	41.60	18.1	52.85	60.73	18.1	59.44	52.31	18.1	12.31	40.12	18.1	2.32	25.71
26.74	41.27	19.1	52.52	60.39	19.1	59.40	52.01	19.1	12.15	39.91	19.1	2.24	25.49
26.76	41.00	20.0	52.20	60.05	20.1	59.37	51.72	20.1	11.99	39.68	20.1	2.18	25.30
26.78	40.71	21.0	51.91	59.68	21.1	59.34	51.46	21.1	11.84	39.45	21.1	2.12	25.10
26.79	40.44	22.0	51.66	59.29	22.1	59.29	51.20	22.1	11.68	39.18	22.1	2.04	24.92
26.79	40.19	23.0	51.43	58.90	23.1	59.24	50.94	23.1	11.54	38.89	23.1	1.96	24.74
26.80	39.91	24.0	51.24	58.51	24.1	59.18	50.68	24.1	11.40	38.59	24.1	1.88	24.58
26.79	39.60	25.0	51.07	58.15	25.0	59.10	50.41	25.1	11.27	38.32	25.1	1.79	24.40
26.78	39.28	26.0	50.91	57.79	26.0	59.04	50.10	26.1	11.15	38.06	26.1	1.69	24.18
26.79	38.96	27.0	50.75	57.46	27.0	58.98	49.78	27.1	11.03	37.81	27.1	1.59	23.93
26.82	38.61	28.0	50.56	57.14	28.0	58.93	49.43	28.1	10.90	37.57	28.1	1.49	23.66
26.85	38.26	29.0	50.34	56.83	29.0	58.91	49.07	29.1	10.78	37.35	29.1	1.41	23.39
26.90	37.92	30.0	50.09	56.51	30.0	58.90	48.71	30.1	10.65	37.15	30.1	1.33	23.10
26.98	37.60	31.0	49.85	56.17	31.0	58.91	48.38	31.1	10.51	36.92	31.1	1.28	22.80
27.06	37.31	32.0	49.61	55.81	32.0	58.95	48.07	32.1	10.38	36.67	32.1	1.24	22.51
57	−8.51		23.40	+23.37		9.89	−9.84		7.35	+7.28		6.25	−6.17
13m 27s.793			15h 3m 41s.175			15h 23m 56s.594			16h 54m 25s.488			17h 15m 54s.896	
17′ 21″.03			+87° 33′ 10″.52			−84° 11′ 30″.39			+82° 10′ 32″.75			−80° 47′ 6″.56	

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Ursæ Minoris. Mag. 4.4			χ Octantis. Mag. 5.2			λ Ursæ Minoris. Mag. 6.6			σ Octantis. Mag. 5.5			76 Draconis. Mag. 5.7		
Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	[illegible]
Oct.	17 58	+86 37	Oct.	18 6	−87 40	Oct.	19 0	+89 1	Oct.	19 29	−89 13	Oct.	20 48	[illegible]
	s	″		s	″		s	″		s	″		s	[illegible]
1.2	36.90	8.51	1.2	46.63	11.22	1.3	88.46	25.23	1.3	48.60	40.11	1.3	40.54	[illegible]
2.2	36.49	8.52	2.2	46.11	11.13	2.3	87.06	25.34	2.3	46.95	40.13	2.3	40.42	[illegible]
3.2	36.04	8.52	3.2	45.64	11.03	3.3	85.59	25.45	3.3	45.38	40.14	3.3	40.28	[illegible]
4.2	35.58	8.50	4.2	45.20	10.94	4.3	84.04	25.56	4.3	43.91	40.14	4.3	40.14	[illegible]
5.2	35.12	8.47	5.2	44.75	10.84	5.3	82.43	25.63	5.3	42.50	40.14	5.3	39.99	[illegible]
6.2	34.67	8.42	6.2	44.31	10.76	6.3	80.80	25.69	6.3	41.15	40.18	6.3	39.83	[illegible]
7.2	34.20	8.32	7.2	43.88	10.69	7.2	79.17	25.73	7.3	39.79	40.23	7.3	39.66	[illegible]
8.2	33.77	8.22	8.2	43.42	10.63	8.2	77.57	25.73	8.3	38.38	40.27	8.3	39.49	[illegible]
9.2	33.33	8.11	9.2	42.95	10.58	9.2	76.01	25.72	9.3	36.91	40.32	9.3	39.32	[illegible]
10.2	32.92	8.01	10.2	42.44	10.50	10.2	74.51	25.72	10.3	35.36	40.36	10.3	39.15	[illegible]
11.2	32.53	7.90	11.2	41.92	10.42	11.2	73.07	25.70	11.3	33.75	40.41	11.3	39.00	[illegible]
12.2	32.15	7.79	12.2	41.38	10.34	12.2	71.68	25.69	12.3	32.06	40.42	12.3	38.84	[illegible]
13.2	31.76	7.69	13.2	40.83	10.24	13.2	70.31	25.70	13.3	30.33	40.43	13.3	38.68	[illegible]
14.2	31.39	7.60	14.2	40.30	10.10	14.2	68.95	25.71	14.2	28.56	40.41	14.3	38.53	[illegible]
15.2	31.01	7.53	15.2	39.77	9.95	15.2	67.59	25.71	15.2	26.81	40.38	15.3	38.39	[illegible]
16.2	30.62	7.45	16.2	39.26	9.78	16.2	66.20	25.74	16.2	25.08	40.35	16.3	38.24	[illegible]
17.2	30.21	7.38	17.2	38.79	9.60	17.2	64.78	25.77	17.2	23.41	40.27	17.3	38.10	[illegible]
18.2	29.80	7.30	18.2	38.35	9.41	18.2	63.29	25.80	18.2	21.83	40.19	18.3	37.94	[illegible]
19.2	29.37	7.20	19.2	37.94	9.23	19.2	61.73	25.81	19.2	20.35	40.09	19.3	37.77	[illegible]
20.2	28.94	7.07	20.2	37.56	9.08	20.2	60.13	25.81	20.2	18.94	40.03	20.3	37.60	[illegible]
21.2	28.50	6.94	21.2	37.18	8.93	21.2	58.50	25.77	21.2	17.60	39.96	21.3	37.42	[illegible]
22.2	28.06	6.77	22.2	36.81	8.79	22.2	56.84	25.73	22.2	16.28	39.91	22.3	37.24	[illegible]
23.2	27.65	6.59	23.2	36.42	8.66	23.2	55.24	25.67	23.2	14.91	39.87	23.3	37.05	[illegible]
24.2	27.26	6.39	24.2	36.00	8.53	24.2	53.73	25.58	24.2	13.46	39.84	24.3	36.87	[illegible]
25.2	26.88	6.20	25.2	35.54	8.38	25.2	52.29	25.47	25.2	11.92	39.81	25.3	36.69	[illegible]
26.2	26.53	6.02	26.2	35.07	8.21	26.2	50.92	25.38	26.2	10.28	39.77	26.3	36.52	[illegible]
27.1	26.19	5.87	27.2	34.59	8.01	27.2	49.61	25.32	27.2	8.58	39.69	27.3	36.37	[illegible]
28.1	25.85	5.73	28.2	34.13	7.78	28.2	48.31	25.28	28.2	6.87	39.57	28.3	36.22	[illegible]
29.1	25.48	5.60	29.1	33.70	7.54	29.2	46.97	25.24	29.2	5.22	39.43	29.3	36.06	[illegible]
30.1	25.11	5.47	30.1	33.31	7.28	30.2	45.58	25.21	30.2	3.66	39.28	30.3	35.91	[illegible]
31.1	24.73	5.33	31.1	32.96	7.03	31.2	44.11	25.18	31.2	2.19	39.10	31.3	35.73	[illegible]
32.1	24.34	5.20	32.1	32.63	6.78	32.2	42.60	25.14	32.2	0.85	38.92	32.3	35.56	[illegible]
16.95		+16.93	24.59		−24.57	58.70		+58.69	74.21		−74.20	7.40		+7.33
17^h	59^m	$1^s.307$	18^h	6^m	$11^s.893$	19^h	2^m	$39^s.624$	19^h	27^m	$42^s.218$	20^h	48^m	$40^s.49$[illegible]
+86°	36′	51″.17	−87°	39′	51″.82	+89°	1′	2″.17	−89°	13′	28″.57	+82°	13′	29″.[illegible]

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

ısse. 2		ζ Mensæ. Mag. 5.6			51 H. Cephei. Mag. 5.3			25 H. Camelop. Mag. 5.1			7 G. Octantis. Mag. 6.4		
	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
	−84 49	Nov.	6 46	−80 43	Nov.	7 2	+87 10	Nov.	7 14	+82 34	Nov.	7 16	−86 53
	″		s	″		s	″		s	″		s	″
	30.12	0.7	56.73	24.15	0.7	48.96	32.05	0.7	0.91	6.58	0.7	5.65	55.04
	30.40	1.7	56.84	24.37	1.7	49.51	32.10	1.7	1.13	6.61	1.7	5.98	55.22
	30.66	2.7	56.95	24.58	2.7	50.07	32.18	2.7	1.36	6.65	2.7	6.30	55.40
	30.90	3.7	57.06	24.76	3.7	50.62	32.29	3.7	1.58	6.72	3.7	6.62	55.55
	31.13	4.7	57.16	24.95	4.7	51.16	32.41	4.7	1.79	6.82	4.7	6.94	55.69
	31.37	5.7	57.27	25.12	5.7	51.67	32.54	5.7	1.99	6.93	5.7	7.27	55.83
	31.61	6.7	57.38	25.30	6.7	52.15	32.68	6.7	2.18	7.04	6.7	7.62	55.99
	31.86	7.7	57.49	25.50	7.7	52.61	32.81	7.7	2.36	7.14	7.7	7.98	56.15
	32.12	8.7	57.61	25.71	8.7	53.05	32.94	8.7	2.54	7.24	8.7	8.34	56.32
	32.40	9.6	57.73	25.93	9.7	53.48	33.07	9.7	2.71	7.35	9.7	8.71	56.49
	32.71	10.6	57.85	26.19	10.7	53.89	33.20	10.7	2.88	7.46	10.7	9.08	56.69
	33.03	11.6	57.96	26.46	11.7	54.31	33.31	11.7	3.05	7.55	11.7	9.45	56.90
3	33.37	12.6	58.07	26.73	12.6	54.74	33.41	12.7	3.21	7.63	12.7	9.80	57.14
6	33.71	13.6	58.18	27.03	13.6	55.19	33.51	13.7	3.39	7.70	13.7	10.14	57.39
.6	34.04	14.6	58.28	27.33	14.6	55.65	33.62	14.7	3.57	7.77	14.7	10.46	57.65
6	34.38	15.6	58.37	27.63	15.6	56.14	33.74	15.6	3.76	7.86	15.7	10.75	57.91
4	34.71	16.6	58.46	27.93	16.6	56.65	33.86	16.6	3.97	7.96	16.6	11.01	58.16
73	35.01	17.6	58.54	28.22	17.6	57.16	34.02	17.6	4.17	8.09	17.6	11.26	58.41
31	35.30	18.6	58.62	28.47	18.6	57.66	34.19	18.6	4.38	8.25	18.6	11.51	58.64
39	35.57	19.6	58.70	28.72	19.6	58.14	34.38	19.6	4.58	8.43	19.6	11.76	58.86
98	35.85	20.6	58.79	28.97	20.6	58.59	34.58	20.6	4.76	8.61	20.6	12.03	59.06
08	36.13	21.6	58.87	29.23	21.6	59.01	34.80	21.6	4.93	8.80	21.6	12.31	59.27
18	36.44	22.6	58.97	29.49	22.6	59.38	35.01	22.6	5.08	8.98	22.6	12.61	59.50
28	36.76	23.6	59.06	29.78	23.6	59.74	35.21	23.6	5.23	9.14	23.6	12.91	59.77
37	37.12	24.6	59.14	30.10	24.6	60.11	35.40	24.6	5.37	9.29	24.6	13.21	60.05
45	37.49	25.6	59.22	30.46	25.6	60.47	35.55	25.6	5.52	9.42	25.6	13.50	60.36
51	37.88	26.6	59.30	30.82	26.6	60.86	35.70	26.6	5.68	9.54	26.6	13.76	60.69
56	38.26	27.6	59.37	31.17	27.6	61.27	35.86	27.6	5.85	9.66	27.6	14.00	61.03
59	38.64	28.6	59.43	31.52	28.6	61.70	36.02	28.6	6.03	9.81	28.6	14.20	61.35
62	38.99	29.6	59.49	31.86	29.6	62.14	36.20	29.6	6.21	9.98	29.6	14.39	61.67
65	39.32	30.6	59.55	32.19	30.6	62.58	36.42	30.6	6.39	10.16	30.6	14.57	61.97
.67	39.63	31.6	59.60	32.49	31.6	63.01	36.64	31.6	6.57	10.37	31.6	14.75	62.26
	−11.04		6.20	−6.12		20.30	+20.27		7.73	+7.67		18.49	−18.46
	ᵐ 14ˢ.756		6ʰ 46ᵐ	58ˢ.546		7ʰ 2ᵐ	4ˢ.048		7ʰ 13ᵐ	42ˢ.294		7ʰ 16ᵐ	20ˢ.292
	′ 46″.89		−80° 43′	38″.16		+87° 10′	54″.74		+82° 34′	30″.13		−86° 54′	6″.70

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT .

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

	...is. ...3	Bradley 1672. Mag. 6.3			ι Octantis. Mag. 5.4			32 H. Camelop. *seq.* Mag. 5.3			κ Octantis. Mag. 5.6		
	Decli-nation.	Wash. Mean Time.	Right Ascen-sion.	Decli-nation.	Wash. Mean Time.	Right Ascen-sion.	Decli-nation.	Wash. Mean Time.	Right Ascen-sion.	Decli-nation.	Wash. Mean Time.	Right Ascen-sion.	Decli-nation.
	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
	−84 8	Nov.	12 13	+88 8	Nov.	12 46	−84 40	Nov.	12 48	+83 51	Nov.	13 27	−85 21
	″		s	″		s	″		s	″		s	″
	55.87	0.9	58.63	61.53	0.9	1.27	34.88	0.9	20.82	19.17	0.9	9.34	56.97
	55.76	1.9	58.94	61.15	1.9	1.43	34.65	1.9	20.88	18.76	1.9	9.49	56.72
	55.66	2.9	59.30	60.76	2.9	1.58	34.44	2.9	20.97	18.35	2.9	9.62	56.47
	55.56	3.9	59.70	60.39	3.9	1.72	34.23	3.9	21.07	17.96	3.9	9.75	56.22
	55.43	4.9	60.15	60.04	4.9	1.85	34.02	4.9	21.17	17.58	4.9	9.86	55.98
	55.30	5.9	60.60	59.71	5.9	1.98	33.79	5.9	21.28	17.21	5.9	9.96	55.71
	55.17	6.9	61.07	59.41	6.9	2.11	33.54	6.9	21.39	16.86	6.9	10.07	55.44
	55.04	7.9	61.50	59.11	7.9	2.25	33.28	7.9	21.50	16.52	7.9	10.20	55.15
	54.89	8.9	61.92	58.82	8.9	2.39	33.01	8.9	21.60	16.20	8.9	10.32	54.86
	54.75	9.9	62.34	58.54	9.9	2.56	32.75	9.9	21.70	15.90	9.9	10.46	54.56
	54.64	10.9	62.73	58.26	10.9	2.73	32.50	10.9	21.79	15.60	10.9	10.62	54.27
	54.54	11.9	63.10	57.98	11.9	2.92	32.25	11.9	21.89	15.29	11.9	10.80	53.98
3	54.43	12.9	63.45	57.68	12.9	3.12	32.01	12.9	21.98	14.97	12.9	10.98	53.70
0	54.37	13.9	63.82	57.39	13.9	3.33	31.79	13.9	22.06	14.64	13.9	11.18	53.43
4	54.32	14.9	64.19	57.08	14.9	3.56	31.59	14.9	22.15	14.30	14.9	11.41	53.19
8	54.28	15.9	64.61	56.76	15.9	3.77	31.40	15.9	22.26	13.94	15.9	11.61	52.96
1	54.27	16.9	65.07	56.43	16.9	3.98	31.25	16.9	22.38	13.56	16.9	11.82	52.77
1	54.27	17.9	65.58	56.10	17.9	4.17	31.10	17.9	22.51	13.19	17.9	12.03	52.58
01	54.25	18.8	66.14	55.78	18.9	4.36	30.96	18.9	22.66	12.84	18.9	12.21	52.39
21	54.21	19.8	66.73	55.49	19.9	4.55	30.80	19.9	22.82	12.51	19.9	12.39	52.19
11	54.16	20.8	67.33	55.21	20.9	4.72	30.62	20.9	22.98	12.20	20.9	12.56	51.97
30	54.12	21.8	67.91	54.97	21.9	4.90	30.43	21.9	23.13	11.91	21.9	12.73	51.74
33	54.07	22.8	68.46	54.74	22.9	5.09	30.25	22.9	23.28	11.63	22.9	12.91	51.51
06	54.02	23.8	68.97	54.52	23.9	5.30	30.06	23.9	23.42	11.37	23.9	13.13	51.27
30	53.98	24.8	69.44	54.31	24.9	5.53	29.88	24.9	23.53	11.11	24.9	13.36	51.03
55	53.98	25.8	69.89	54.07	25.9	5.77	29.70	25.9	23.64	10.84	25.9	13.60	50.79
32	54.02	26.8	70.34	53.83	26.8	6.04	29.56	26.9	23.77	10.55	26.9	13.87	50.59
07	54.06	27.8	70.80	53.56	27.8	6.30	29.43	27.8	23.90	10.25	27.9	14.14	50.41
32	54.12	28.8	71.31	53.30	28.8	6.55	29.33	28.8	24.03	9.94	28.9	14.42	50.26
55	54.20	29.8	71.87	53.04	29.8	6.80	29.25	29.8	24.20	9.62	29.9	14.68	50.12
77	54.27	30.8	72.48	52.77	30.8	7.04	29.18	30.8	24.37	9.31	30.9	14.92	49.99
97	54.33	31.8	73.13	52.53	31.8	7.25	29.10	31.8	24.55	9.02	31.9	15.16	49.86
	−9.76		30.96	+30.94		10.78	−10.73		9.34	+9.29		12.37	−12.33
	55ˢ.280		12^h 14^m $28^s.425$			12^h 46^m $7^s.152$			12^h 48^m $30^s.418$			13^h 27^m $14^s.624$	
	50″.60		+88° 9′ 36″.08			−84° 40′ 22″.34			+83° 51′ 50″.47			−85° 21′ 42″.23	

CIRCUMPO

FOR THE UPPER TRA

93.	ρ O Ma	
li-on.	Wash. Mean Time.	R A. s
′		
32	Nov.	1
31	1.0	5
44	2.0	5
02	3.0	5
61	4.0	5
23	5.0	5
85	6.0	5
47	7.0	5
09	8.0	5
74	9.0	5
40	10.0	5
07	11.0	5
75	11.9	5
42	12.9	5
06	13.9	5
71	14.9	5
34	15.9	5
93	16.9	5
53	17.9	5
12	18.9	5
71	19.9	5
33	20.9	5
95	21.9	5
61	22.9	5
28	23.9	5
96	24.9	5
64	25.9	5
32	26.9	6
96	27.9	6
60	28.9	6
23	29.9	6
85	30.9	6
47	31.9	6
	9.89	
75	15^h	2
52	−84°	1

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

noris. 4	χ Octantis. Mag. 5.2			λ Ursæ Minoris. Mag. 6.6			σ Octantis. Mag. 5.5			76 Draconis. Mag. 5.7		
Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
+86 36	Nov.	18 6	−87 39	Nov.	19 0	+89 1	Nov.	19 28	−89 13	Nov.	20 48	+82 14
″		s	″		s	″		s	″		s	″
65.20	1.1	32.63	66.78	1.2	42.60	25.14	1.2	60.85	38.92	1.3	35.56	4.87
65.02	2.1	32.34	66.53	2.2	41.06	25.06	2.2	59.57	38.77	2.3	35.39	4.98
64.80	3.1	32.05	66.32	3.2	39.50	24.96	3.2	58.31	38.64	3.2	35.21	5.07
64.57	4.1	31.74	66.12	4.2	37.98	24.83	4.2	57.06	38.53	4.2	35.02	5.13
64.34	5.1	31.42	65.91	5.2	36.52	24.69	5.2	55.76	38.41	5.2	34.84	5.18
64.10	6.1	31.07	65.71	6.2	35.11	24.55	6.2	54.42	38.28	6.2	34.65	5.19
63.86	7.1	30.71	65.48	7.2	33.77	24.40	7.2	52.98	38.15	7.2	34.47	5.20
63.62	8.1	30.33	65.26	8.2	32.49	24.25	8.2	51.51	38.02	8.2	34.30	5.18
63.38	9.1	29.95	65.02	9.2	31.25	24.11	9.2	50.00	37.85	9.2	34.13	5.18
63.17	10.1	29.57	64.75	10.2	30.05	23.96	10.2	48.47	37.68	10.2	33.98	5.21
62.98	11.1	29.21	64.47	11.2	28.86	23.83	11.2	46.96	37.49	11.2	33.82	5.24
62.78	12.1	28.87	64.16	12.1	27.66	23.73	12.2	45.47	37.27	12.2	33.66	5.25
62.58	13.1	28.58	63.85	13.1	26.43	23.63	13.2	44.06	37.04	13.2	33.50	5.27
62.38	14.1	28.29	63.55	14.1	25.16	23.50	14.2	42.73	36.81	14.2	33.34	5.31
62.17	15.1	28.06	63.23	15.1	23.83	23.37	15.2	41.52	36.57	15.2	33.17	5.36
61.93	16.1	27.87	62.94	16.1	22.46	23.26	16.2	40.42	36.34	16.2	33.00	5.39
61.68	17.1	27.70	62.64	17.1	21.06	23.10	17.2	39.41	36.11	17.2	32.82	5.40
61.40	18.1	27.54	62.38	18.1	19.65	22.92	18.2	38.44	35.92	18.2	32.64	5.39
61.11	19.1	27.36	62.13	19.1	18.28	22.71	19.1	37.46	35.71	19.2	32.46	5.35
60.80	20.1	27.17	61.89	20.1	16.99	22.49	20.1	36.44	35.51	20.2	32.27	5.30
60.48	21.1	26.94	61.65	21.1	15.78	22.27	21.1	35.33	35.33	21.2	32.09	5.21
60.20	22.1	26.68	61.37	22.1	14.66	22.05	22.1	34.13	35.13	22.2	31.92	5.12
59.91	23.1	26.43	61.07	23.1	13.62	21.85	23.1	32.88	34.90	23.2	31.77	5.06
59.65	24.1	26.17	60.75	24.1	12.62	21.65	24.1	31.60	34.64	24.2	31.61	4.99
59.42	25.1	25.96	60.41	25.1	11.61	21.47	25.1	30.37	34.36	25.2	31.47	4.93
59.18	26.1	25.78	60.05	26.1	10.56	21.30	26.1	29.23	34.07	26.2	31.32	4.89
58.95	27.1	25.66	59.68	27.1	9.46	21.13	27.1	28.21	33.75	27.2	31.18	4.85
58.70	28.1	25.56	59.34	28.1	8.30	20.97	28.1	27.33	33.44	28.2	31.02	4.81
58.43	29.1	25.51	58.99	29.1	7.11	20.78	29.1	26.54	33.14	29.2	30.85	4.77
58.14	30.1	25.45	58.70	30.1	5.90	20.56	30.1	25.82	32.86	30.2	30.68	4.70
57.83	31.1	25.40	58.40	31.1	4.72	20.32	31.1	25.13	32.59	31.2	30.51	4.61
57.50	32.1	25.34	58.10	32.1	3.59	20.06	32.1	24.41	32.33	32.2	30.33	4.51
+16.92	24.57 −24.55			58.66 +58.65			74.11 −74.10			7.40 +7.33		
$1^s.307$	$18^h\ 6^m\ 11^s.893$			$19^h\ 2^m\ 39^s.624$			$19^h\ 27^m\ 42^s.218$			$20^h\ 48^m\ 40^s.494$		
51″.17	−87° 39′ 51″.82			+89° 1′ 2″.17			−89° 13′ 28″.57			+82° 13′ 29″.86		

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

λ Octantis. Mag. 5.4			υ Octantis. Mag. 5.7			β Octantis. Mag. 4.3		
Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
	h m	° ′		h m	° ′		h m	° ′
Nov.	21 38	−83 6	Nov.	22 16	−86 23	Nov.	22 37	−81 48
	s	″		s	″		s	″
1.3	33.26	6.76	1.3	31.46	24.24	1.3	50.89	57.19
2.3	33.11	6.77	2.3	31.16	24.31	2.3	50.77	57.28
3.3	32.97	6.81	3.3	30.88	24.38	3.3	50.64	57.37
4.3	32.82	6.86	4.3	30.60	24.48	4.3	50.53	57.50
5.3	32.67	6.91	5.3	30.31	24.58	5.3	50.41	57.62
6.3	32.50	6.96	6.3	30.00	24.68	6.3	50.30	57.74
7.3	32.34	7.02	7.3	29.69	24.77	7.3	50.17	57.88
8.3	32.16	7.08	8.3	29.37	24.87	8.3	50.03	58.02
9.3	31.98	7.13	9.3	29.03	24.97	9.3	49.88	58.15
10.3	31.79	7.15	10.3	28.66	25.07	10.3	49.73	58.28
11.3	31.59	7.16	11.3	28.29	25.14	11.3	49.56	58.38
12.3	31.40	7.16	12.3	27.90	25.18	12.3	49.40	58.47
13.3	31.21	7.13	13.3	27.52	25.21	13.3	49.24	58.55
14.3	31.01	7.09	14.3	27.16	25.22	14.3	49.08	58.60
15.3	30.83	7.04	15.3	26.80	25.21	15.3	48.93	58.63
16.2	30.68	6.96	16.3	26.47	25.17	16.3	48.80	58.63
17.2	30.53	6.89	17.3	26.15	25.14	17.3	48.67	58.64
18.2	30.38	6.83	18.3	25.86	25.12	18.3	48.54	58.67
19.2	30.24	6.78	19.3	25.57	25.12	19.3	48.42	58.70
20.2	30.10	6.74	20.3	25.27	25.12	20.3	48.30	58.74
21.2	29.94	6.71	21.3	24.96	25.13	21.3	48.17	58.78
22.2	29.77	6.68	22.3	24.64	25.14	22.3	48.03	58.84
23.2	29.59	6.64	23.3	24.28	25.15	23.3	47.86	58.90
24.2	29.39	6.58	24.3	23.90	25.15	24.3	47.70	58.94
25.2	29.20	6.50	25.2	23.51	25.11	25.3	47.53	58.94
26.2	29.01	6.38	26.2	23.13	25.05	26.3	47.36	58.92
27.2	28.83	6.24	27.2	22.75	24.96	27.3	47.20	58.88
28.2	28.66	6.07	28.2	22.40	24.86	28.3	47.05	58.82
29.2	28.52	5.92	29.2	22.08	24.75	29.3	46.92	58.76
30.2	28.38	5.78	30.2	21.77	24.65	30.3	46.78	58.68
31.2	28.24	5.65	31.2	21.49	24.54	31.2	46.66	58.62
32.2	28.11	5.55	32.2	21.20	24.46	32.2	46.53	58.58
	8.33	−8.27		15.88	−15.85		7.02	−6.95
	21^h 38^m	$19^s.542$		22^h 16^m	$8^s.656$		22^h 37^m	$39^s.016$
	−83° 6′	6″.99		−86° 23′	27″.13		−81° 49′	2″.34

39 H. Cephei. Mag. 5.6			γ¹ Octantis. Mag. 5	
Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.
	h m	° ′		h m
Nov.	23 27	+86 51	Nov.	23 47
	s	″		s
1.4	58.20	36.75	1.4	28.01
2.4	57.94	37.09	2.4	27.92
3.4	57.66	37.41	3.4	27.81
4.4	57.35	37.70	4.4	27.71
5.4	57.02	37.99	5.4	27.60
6.4	56.69	38.26	6.4	27.49
7.3	56.37	38.49	7.4	27.38
8.3	56.05	38.73	8.4	27.25
9.3	55.74	38.96	9.4	27.11
10.3	55.45	39.19	10.4	26.97
11.3	55.17	39.42	11.4	26.85
12.3	54.90	39.66	12.3	26.65
13.3	54.63	39.90	13.3	26.49
14.3	54.36	40.16	14.3	26.34
15.3	54.08	40.40	15.3	26.19
16.3	53.77	40.68	16.3	26.04
17.3	53.43	40.95	17.3	25.91
18.3	53.07	41.22	18.3	25.77
19.3	52.69	41.45	19.3	25.65
20.3	52.28	41.65	20.3	25.52
21.3	51.90	41.85	21.3	25.39
22.3	51.52	42.02	22.3	25.25
23.3	51.18	42.18	23.3	25.08
24.3	50.85	42.35	24.3	24.92
25.3	50.53	42.50	25.3	24.74
26.3	50.24	42.66	26.3	24.57
27.3	49.93	42.86	27.3	24.39
28.3	49.61	43.06	28.3	24.23
29.3	49.25	43.26	29.3	24.06
30.3	48.88	43.47	30.3	23.92
31.3	48.47	43.65	31.3	23.78
32.3	48.06	43.78	32.3	23.64
	18.26	+18.24		7.64
	23^h 27^m	$44^s.125$		23^h 47^m
	+86° 50′	58″.89		−82° 28′

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT

CIRCUMPOLAR STARS.

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT .

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

…ntis. Mag. 4.1		Groombridge 2283. Mag. 7.2			ρ Octantis. Mag. 5.7			ε Ursæ Minoris. Mag. 4.4			59 G. Apodis. Mag. 5.9		
…t …n- .	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
n	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
3	−83 17	Dec.	15 2	+87 32	Dec.	15 24	−84 11	Dec.	16 54	+82 10	Dec.	17 16	−80 47
	″		s	″		s	″		s	″		s	″
0	29.35	0.9	48.48	44.85	0.9	0.60	38.97	1.0	7.82	27.13	1.0	0.43	13.82
5	29.18	1.9	48.61	44.47	1.9	0.72	38.73	2.0	7.77	26.76	2.0	0.45	13.55
8	28.98	2.9	48.75	44.08	2.9	0.82	38.49	3.0	7.74	26.37	3.0	0.47	13.29
2	28.80	3.9	48.93	43.72	3.9	0.92	38.24	4.0	7.72	25.98	4.0	0.48	13.02
4	28.61	4.9	49.12	43.38	4.9	1.02	37.98	4.9	7.70	25.61	5.0	0.48	12.73
8	28.39	5.9	49.31	43.05	5.9	1.13	37.72	5.9	7.68	25.25	6.0	0.48	12.42
3	28.18	6.9	49.50	42.73	6.9	1.25	37.43	6.9	7.67	24.91	7.0	0.49	12.11
9	27.96	7.9	49.69	42.42	7.9	1.37	37.13	7.9	7.66	24.58	8.0	0.50	11.78
6	27.74	8.9	49.87	42.14	8.9	1.50	36.84	8.9	7.65	24.25	9.0	0.51	11.42
3	27.54	9.9	50.02	41.83	9.9	1.65	36.54	9.9	7.63	23.94	10.0	0.55	11.08
2	27.34	10.9	50.17	41.53	10.9	1.82	36.25	10.9	7.60	23.62	10.9	0.59	10.74
1	27.16	11.9	50.32	41.23	11.9	2.00	35.97	11.9	7.58	23.30	11.9	0.64	10.41
01	27.01	12.9	50.46	40.90	12.9	2.19	35.74	12.9	7.57	22.95	12.9	0.70	10.07
23	26.88	13.9	50.63	40.56	13.9	2.38	35.51	13.9	7.56	22.60	13.9	0.77	9.76
43	26.78	14.9	50.81	40.22	14.9	2.57	35.32	14.9	7.54	22.23	14.9	0.85	9.48
31	26.69	15.9	51.04	39.85	15.9	2.76	35.13	15.9	7.53	21.84	15.9	0.92	9.21
80	26.59	16.9	51.31	39.50	16.9	2.93	34.96	16.9	7.53	21.44	16.9	0.97	8.95
97	26.48	17.9	51.61	39.17	17.9	3.09	34.77	17.9	7.56	21.03	17.9	1.03	8.69
13	26.35	18.9	51.92	38.85	18.9	3.24	34.58	18.9	7.58	20.66	18.9	1.08	8.42
29	26.22	19.9	52.24	38.55	19.9	3.39	34.36	19.9	7.61	20.29	19.9	1.12	8.14
46	26.07	20.9	52.55	38.27	20.9	3.56	34.13	20.9	7.65	19.96	20.9	1.16	7.82
65	25.92	21.9	52.84	38.03	21.9	3.73	33.87	21.9	7.68	19.65	21.9	1.21	7.51
87	25.77	22.9	53.10	37.78	22.9	3.92	33.62	22.9	7.70	19.34	22.9	1.27	7.18
09	25.64	23.9	53.34	37.52	23.9	4.14	33.40	23.9	7.72	19.03	23.9	1.35	6.85
.32	25.55	24.9	53.58	37.26	24.9	4.37	33.20	24.9	7.74	18.72	24.9	1.44	6.52
.55	25.48	25.9	53.82	37.00	25.9	4.61	33.00	25.9	7.75	18.39	25.9	1.53	6.21
.77	25.42	26.9	54.09	36.72	26.9	4.84	32.83	26.9	7.76	18.06	26.9	1.64	5.93
.00	25.37	27.9	54.39	36.42	27.9	5.07	32.69	27.9	7.80	17.69	27.9	1.75	5.67
.19	25.34	28.9	54.73	36.13	28.9	5.28	32.56	28.9	7.85	17.31	28.9	1.84	5.43
.39	25.32	29.9	55.10	35.83	29.9	5.48	32.43	29.9	7.89	16.93	29.9	1.93	5.20
.58	25.27	30.9	55.49	35.55	30.9	5.68	32.30	30.9	7.94	16.57	30.9	2.02	4.96
.76	25.23	31.9	55.90	35.28	31.9	5.87	32.15	31.9	8.00	16.21	31.9	2.10	4.70
	−8.50		23.34	+23.32		9.88	−9.83		7.34	+7.27		6.24	−6.16
s	27s.793		15h 3m 41s.175			15h 23m 56s.594			16h 54m 25s.488			17h 15m 54s.896	
	21″.03		+87° 33′ 10″.52			−84° 11′ 30″.39			+82° 10′ 32″.75			−80° 47′ 6″.56	

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

δ Ursæ Minoris. Mag. 4.4			χ Octantis. Mag. 5.2			λ Ursæ Minoris. Mag. 6.6			σ Octantis. Mag. 5.5			76 Dra… Mag…	
Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Ri… Asc… sio…
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h
Dec.	17 58	+86 36	Dec.	18 6	−87 39	Dec.	18 59	+89 1	Dec.	19 28	−89 13	Dec.	20
	s	″		s	″		s	″		s	″		s
1.1	15.43	57.83	1.1	25.40	58.40	1.1	64.72	20.32	1.1	25.13	32.59	1.2	30.
2.1	15.20	57.50	2.1	25.34	58.10	2.1	63.59	20.06	2.1	24.41	32.33	2.2	30.
3.0	15.00	57.16	3.1	25.26	57.81	3.1	62.55	19.79	3.1	23.66	32.07	3.2	30.
4.0	14.81	56.81	4.1	25.17	57.54	4.1	61.58	19.52	4.1	22.84	31.81	4.2	30.
5.0	14.66	56.47	5.0	25.06	57.22	5.1	60.68	19.24	5.1	21.98	31.55	5.2	29.
6.0	14.50	56.14	6.0	24.93	56.90	6.1	59.84	18.96	6.1	21.10	31.28	6.2	29.
7.0	14.36	55.83	7.0	24.82	56.56	7.1	59.05	18.69	7.1	20.18	31.00	7.2	29.
8.0	14.22	55.52	8.0	24.71	56.22	8.1	58.29	18.43	8.1	19.28	30.69	8.2	29.
9.0	14.09	55.23	9.0	24.65	55.86	9.1	57.54	18.20	9.1	18.44	30.35	9.2	29.
10.0	13.96	54.95	10.0	24.59	55.48	10.1	56.76	17.98	10.1	17.65	30.01	10.1	29.
11.0	13.82	54.68	11.0	24.59	55.11	11.1	55.97	17.76	11.1	16.96	29.67	11.1	29.
12.0	13.67	54.40	12.0	24.62	54.73	12.1	55.14	17.53	12.1	16.37	29.33	12.1	28.
13.0	13.49	54.11	13.0	24.69	54.38	13.1	54.25	17.30	13.1	15.92	28.98	13.1	28.
14.0	13.32	53.79	14.0	24.79	54.04	14.1	53.32	17.03	14.1	15.57	28.63	14.1	28.
15.0	13.17	53.45	15.0	24.90	53.71	15.1	52.41	16.76	15.1	15.30	28.29	15.1	28.
16.0	13.02	53.09	16.0	25.02	53.39	16.1	51.51	16.45	16.1	15.05	27.98	16.1	28.
17.0	12.88	52.72	17.0	25.12	53.11	17.1	50.68	16.13	17.1	14.78	27.69	17.1	28.
18.0	12.79	52.34	18.0	25.19	52.82	18.1	49.96	15.81	18.1	14.44	27.39	18.1	28.
19.0	12.73	51.97	19.0	25.24	52.51	19.0	49.32	15.47	19.1	14.03	27.10	19.1	27.
20.0	12.67	51.62	20.0	25.27	52.20	20.0	48.79	15.14	20.1	13.53	26.79	20.1	27.
21.0	12.63	51.28	21.0	25.29	51.85	21.0	48.33	14.84	21.1	13.02	26.46	21.1	27.
21.9	12.60	51.01	22.0	25.34	51.47	22.0	47.87	14.56	22.1	12.53	26.09	22.1	27.
22.9	12.56	50.72	22.9	25.44	51.10	23.0	47.41	14.32	23.1	12.11	25.73	23.1	27.
23.9	12.50	50.42	23.9	25.58	50.72	24.0	46.91	14.08	24.1	11.82	25.35	24.1	27.
24.9	12.44	50.13	24.9	25.75	50.36	25.0	46.35	13.82	25.1	11.65	24.95	25.1	27.
25.9	12.35	49.82	25.9	25.97	50.02	26.0	45.74	13.55	26.0	11.62	24.56	26.1	27.
26.9	12.28	49.49	26.9	26.21	49.68	27.0	45.12	13.26	27.0	11.66	24.20	27.1	27.
27.9	12.22	49.15	27.9	26.44	49.34	28.0	44.51	12.94	28.0	11.76	23.85	28.1	26.
28.9	12.17	48.78	28.9	26.67	49.06	29.0	43.97	12.61	29.0	11.86	23.53	29.1	26.
29.9	12.16	48.41	29.9	26.90	48.78	30.0	43.48	12.25	30.0	11.93	23.20	30.1	26.
30.9	12.15	48.03	30.9	27.09	48.49	31.0	43.10	11.89	31.0	11.95	22.88	31.1	26.
31.9	12.18	47.67	31.9	27.28	48.17	32.0	42.78	11.54	32.0	11.93	22.57	32.1	26.
16.94		+16.91	24.54		−24.52	58.55		+58.54	73.89		−73.88	7.40	
17^h	59^m	$1^s.307$	18^h	6^m	$11^s.893$	19^h	2^m	$39^s.624$	19^h	27^m	$42^s.218$	20^h	48^s
+86°	*36′*	*51″.17*	−87°	39′	51″.82	+89°	1′	2″.17	−89°	13′	28″.57	+82°	1…

CIRCUMPOLAR STARS.

FOR THE UPPER TRANSIT AT WASHINGTON.

	. Octantis. Mag. 5.4			υ Octantis. Mag. 5.7			β Octantis. Mag. 4.3			39 H. Cephei. Mag. 5.6			γ¹ Octantis. Mag. 5.1	
	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.	Wash. Mean Time.	Right Ascension.	Declination.
	h m	° ′		h m	° ′		h m	° ′		h m	° ′		h m	° ′
	21 38	−83 5	Dec.	22 16	−86 23	Dec.	22 37	−81 48	Dec.	23 27	+86 51	Dec.	23 47	−82 28
	s	″		s	″		s	″		s	″		s	″
	28.24	65.65	1.2	21.49	24.54	1.2	46.66	58.62	1.3	48.47	43.65	1.3	23.78	42.47
	28.11	65.55	2.2	21.20	24.46	2.2	46.53	58.58	2.3	48.06	43.78	2.3	23.64	42.50
	27.98	65.44	3.2	20.93	24.38	3.2	46.41	58.54	3.3	47.65	43.92	3.3	23.50	42.55
	27.83	65.34	4.2	20.60	24.31	4.2	46.28	58.51	4.3	47.23	44.03	4.3	23.36	42.60
	27.68	65.23	5.2	20.28	24.25	5.2	46.14	58.48	5.3	46.82	44.13	5.3	23.20	42.66
	27.51	65.10	6.2	19.94	24.18	6.2	45.99	58.45	6.3	46.43	44.21	6.3	23.04	42.72
	27.34	64.97	7.2	19.60	24.10	7.2	45.84	58.41	7.3	46.05	44.29	7.3	22.86	42.79
	27.17	64.82	8.2	19.24	24.00	8.2	45.69	58.35	8.3	45.68	44.36	8.3	22.69	42.85
	26.99	64.65	9.2	18.88	23.87	9.2	45.52	58.27	9.3	45.32	44.45	9.3	22.51	42.89
	26.82	64.47	10.2	18.52	23.73	10.2	45.36	58.18	10.3	44.99	44.54	10.3	22.33	42.90
	26.67	64.27	11.2	18.18	23.57	11.2	45.21	58.06	11.3	44.65	44.61	11.3	22.14	42.90
	26.52	64.04	12.2	17.84	23.39	12.2	45.06	57.93	12.3	44.32	44.72	12.3	21.97	42.86
	26.39	63.81	13.2	17.52	23.20	13.2	44.91	57.77	13.3	43.94	44.83	13.3	21.80	42.82
	26.26	63.57	14.2	17.24	23.02	14.2	44.79	57.62	14.2	43.55	44.94	14.3	21.64	42.76
	26.15	63.35	15.2	16.99	22.82	15.2	44.68	57.47	15.2	43.14	45.04	15.3	21.50	42.68
	26.05	63.13	16.2	16.74	22.61	16.2	44.58	57.30	16.2	42.72	45.14	16.3	21.36	42.62
2	25.95	62.93	17.2	16.49	22.43	17.2	44.46	57.15	17.2	42.27	45.20	17.3	21.22	42.56
2	25.83	62.74	18.2	16.22	22.29	18.2	44.34	57.04	18.2	41.81	45.23	18.2	21.08	42.52
.2	25.71	62.56	19.2	15.96	22.14	19.2	44.22	56.94	19.2	41.38	45.24	19.2	20.93	42.49
.2	25.58	62.37	20.2	15.64	21.97	20.2	44.09	56.82	20.2	40.98	45.24	20.2	20.76	42.47
.2	25.44	62.16	21.2	15.32	21.80	21.2	43.96	56.69	21.2	40.60	45.22	21.2	20.59	42.43
.2	25.30	61.93	22.2	15.02	21.61	22.2	43.80	56.55	22.2	40.23	45.21	22.2	20.41	42.39
.1	25.15	61.67	23.2	14.69	21.40	23.2	43.65	56.37	23.2	39.90	45.23	23.2	20.23	42.32
.1	25.01	61.39	24.2	14.38	21.15	24.2	43.51	56.16	24.2	39.57	45.24	24.2	20.05	42.23
5.1	24.90	61.10	25.2	14.09	20.88	25.2	43.38	55.93	25.2	39.23	45.27	25.2	19.87	42.11
6.1	24.79	60.80	26.2	13.82	20.61	26.2	43.26	55.70	26.2	38.86	45.31	26.2	19.71	41.97
7.1	24.70	60.51	27.2	13.59	20.35	27.2	43.16	55.46	27.2	38.46	45.34	27.2	19.57	41.83
8.1	24.62	60.23	28.2	13.37	20.10	28.2	43.05	55.23	28.2	38.05	45.35	28.2	19.42	41.69
9.1	24.55	59.96	29.2	13.16	19.85	29.2	42.96	55.04	29.2	37.63	45.34	29.2	19.28	41.56
0.1	24.47	59.70	30.2	12.96	19.61	30.2	42.87	54.83	30.2	37.20	45.30	30.2	19.15	41.43
1.1	24.38	59.45	31.2	12.74	19.39	31.2	42.76	54.63	31.2	36.77	45.25	31.2	19.01	41.31
2.1	24.30	59.20	32.1	12.52	19.16	32.2	42.66	54.45	32.2	36.35	45.19	32.2	18.87	41.19
	8.32	−8.26		15.88	−15.85		7.02	−6.95		18.27	+18.24		7.64	−7.57
	21ʰ 38ᵐ	19ˢ.542		22ʰ 16ᵐ	8ˢ.656		22ʰ 37ᵐ	39ˢ.016		23ʰ 27ᵐ	44ˢ.125		23ʰ 47ᵐ	16ˢ.424
	−83° 6′	6″.99		−86° 23′	27″.13		−81° 49′	2″.34		+86° 50′	58″.89		−82° 28′	48″.42

D

FOR THE UPPER TRANSIT AT WASHINGTON.

ngton Time.	12 Ceti. Mag. 6.0 Right Ascension.		12 Ceti. Declination.		13 Ceti. Mag. 5.2 Right Ascension.		13 Ceti. Declination.	
	h m		° ′		h m		° ′	
	0 25		− 4 24		0 30		− 4 2	
	s		″		s		″	
0.2	49.149		52.80		59.497		54.33	
10.2	49.041	108	53.42	62	59.389	108	54.95	62
20.2	48.936	105	53.93	51	59.283	106	55.48	53
30.2	48.838	98	54.32	39	59.184	99	55.89	41
. 9.1	48.752	86	54.56	24	59.096	88	56.14	25
19.1	48.685	67	54.64	8	59.026	70	56.24	10
. 1.1	48.640	45	54.53	11	58.977	49	56.15	9
11.1	48.624	16	54.21	32	58.958	19	55.85	30
21.0	48.642	18	53.67	54	58.971	13	55.33	52
31.0	48.696	54	52.88	79	59.020	49	54.56	77
:. 10.0	48.789	93	51.86	102	59.109	89	53.57	99
19.9	48.924	135	50.59	127	59.239	130	52.33	124
29.9	49.098	174	49.10	149	59.410	171	50.87	146
y 9.9	49.311	213	47.41	169	59.619	209	49.20	167
19.9	49.558	247	45.56	185	59.862	243	47.37	183
29.8	49.831	273	43.57	199	60.134	272	45.40	197
ne 8.8	50.128	297	41.51	206	60.428	294	43.35	205
18.8	50.439	311	39.42	209	60.739	311	41.27	208
28.8	50.756	317	37.36	206	61.055	316	39.20	207
ly 8.7	51.071	315	35.37	199	61.371	316	37.21	199
18.7	51.375	304	33.51	186	61.677	306	35.34	187
28.7	51.663	288	31.83	168	61.968	291	33.65	169
g. 7.6	51.926	263	30.36	147	62.234	266	32.17	148
17.6	52.161	235	29.14	122	62.473	239	30.93	124
27.6	52.361	200	28.18	96	62.678	205	29.95	98
pt. 6.6	52.525	164	27.51	67	62.848	170	29.25	70
16.5	52.651	126	27.10	41	62.980	132	28.82	43
26.5	52.741	90	26.97	13	63.075	95	28.67	15
ct. 6.5	52.794	53	27.06	9	63.135	60	28.75	8
16.5	52.814	20	27.38	32	63.161	26	29.05	30
26.4	52.805	9	27.87	49	63.158	3	29.52	47
ov. 5.4	52.769	36	28.49	62	63.127	31	30.13	61
15.4	52.712	57	29.21	72	63.074	53	30.86	73
25.3	52.636	76	29.98	77	63.002	72	31.63	77
ec. 5.3	52.546	90	30.78	80	62.916	86	32.43	80
15.3	52.446	100	31.57	79	62.818	98	33.22	79
25.3	52.338	108	32.32	75	62.712	106	33.98	76
35.2	52.227	111	32.99	67	62.602	110	34.67	69
an Place	48.196		56.65		58.516		58.34	
δ, Tan δ	1.003		−0.077		1.002		−0.071	
, $D_\omega \alpha$	+0.06		+0.01		+0.06		0.00	
$D_\omega \delta$	+0.4		+0.1		+0.4		+0.1	

ngton Time.	ζ Cassiopeiæ. Mag. 3.7 Right Ascension.		ζ Cassiopeiæ. Declination.		π Andromedæ. Mag. 4.4 Right Ascension.		π Andromedæ. Declination.	
	h m		° ′		h m		° ′	
	0 32		+53 26		0 32		+33 15	
	s		″		s		″	
0.2	21.192		47.51		27.519		62.36	
10.2	20.942	250	47.02	49	27.371	148	61.66	70
20.2	20.693	249	46.05	97	27.224	147	60.67	99
30.2	20.456	237	44.64	141	27.083	141	59.40	127
. 9.1	20.244	212	42.84	180	26.958	125	57.93	147
19.1	20.067	177	40.73	211	26.854	104	56.30	163
. 1.1	19.935	132	38.40	233	26.781	73	54.60	170
11.1	19.858	77	35.96	244	26.744	37	52.91	169
21.0	19.845	13	33.50	246	26.749	5	51.31	160
31.0	19.901	56	31.13	237	26.803	54	49.87	144
:. 10.0	20.026	125	28.96	217	26.906	103	48.67	120
19.9	20.222	196	27.06	190	27.059	153	47.75	92
29.9	20.485	263	25.52	154	27.262	203	47.19	56
y 9.9	20.807	322	24.41	111	27.510	248	47.01	18
19.9	21.183	376	23.75	66	27.796	286	47.21	20
29.8	21.601	418	23.58	17	28.116	320	47.81	60
ne 8.8	22.048	447	23.89	31	28.460	344	48.79	98
18.8	22.514	466	24.69	80	28.819	359	50.13	134
28.8	22.986	472	25.96	127	29.183	364	51.80	167
ly 8.7	23.452	466	27.65	169	29.544	361	53.74	194
18.7	23.901	449	29.73	208	29.892	348	55.91	217
28.7	24.323	422	32.13	240	30.220	328	58.26	235
g. 7.6	24.709	386	34.82	269	30.521	301	60.72	246
17.6	25.052	343	37.73	291	30.788	267	63.24	252
27.6	25.347	295	40.80	307	31.020	232	65.78	254
pt. 6.6	25.589	242	43.95	315	31.211	191	68.28	250
16.5	25.776	187	47.13	318	31.361	150	70.69	241
26.5	25.910	134	50.28	315	31.470	109	72.98	229
ct. 6.5	25.989	79	53.32	304	31.540	70	75.08	210
16.5	26.016	27	56.22	290	31.572	32	77.00	192
26.4	25.994	22	58.90	268	31.571	1	78.67	167
ov. 5.4	25.924	70	61.31	241	31.537	34	80.10	143
15.4	25.811	113	63.39	208	31.475	62	81.23	113
25.3	25.659	152	65.08	169	31.388	87	82.05	82
ec. 5.3	25.475	184	66.35	127	31.281	107	82.55	50
15.3	25.260	215	67.15	80	31.155	126	82.71	16
25.3	25.025	235	67.45	30	31.015	140	82.53	18
35.2	24.776	249	67.26	19	30.868	147	82.02	51
an Place	20.390		25.07		26.620		45.46	
δ, Tan δ	1.679		+1.349		1.196		+0.656	
, $D_\omega \alpha$	+0.07		−0.09		+0.06		−0.04	
$D_\omega \delta$	+0.4		+0.1		+0.4		+0.1	

D

FOR THE UPPER TRANSIT AT WASHINGTON.

	β Ceti. Mag. 2.2				o Cassiopeiæ. Mag. 4.7				21 Cassiopeiæ. Mag. 5.6				ζ Andromedæ. Mag. 4.3			
	Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.	
	h m 0 39		° ′ −18 25		h m 0 40		° ′ +47 49		h m 0 40		° ′ +74 32		h m 0 42		° ′ +23 48	
	s		″		s		″		s		″		s		″	
	26.503	123	91.72	48	6.539	209	70.41	48	9.22	69	30.88	1	57.151	127	71.04	69
	26.380	121	92.20	22	6.330	211	69.93	93	8.53	69	30.87	61	57.024	128	70.35	88
	26.259	114	92.42	4	6.119	203	69.00	132	7.84	66	30.26	120	56.896	124	69.47	105
	26.145	103	92.38	31	5.916	185	67.68	167	7.18	60	29.06	173	56.772	113	68.42	120
	26.042	86	92.07	58	5.731	156	66.01	194	6.58	52	27.33	220	56.659	96	67.22	125
	25.956	63	91.49	84	5.575	117	64.07	215	6.06	39	25.13	257	56.563	71	65.97	127
	25.893	34	90.85	112	5.458	71	61.92	223	5.67	28	22.56	282	56.492	39	64.70	122
	25.859	2	89.53	136	5.387	16	59.69	224	5.39	13	19.74	295	56.453	3	63.48	110
	25.857	36	88.17	161	5.371	44	57.45	214	5.26	4	16.79	297	56.450	41	62.38	93
	25.893	77	86.56	183	5.415	107	55.31	196	5.30	18	13.82	288	56.491	86	61.45	69
	25.970	119	84.73	201	5.522	169	53.36	167	5.48	34	10.94	265	56.577	132	60.76	42
	26.089	162	82.72	219	5.691	230	51.69	132	5.82	49	8.29	235	56.709	179	60.34	10
	26.251	202	80.53	230	5.921	287	50.37	95	6.31	60	5.94	195	56.888	221	60.24	24
	26.453	238	78.23	238	6.208	335	49.42	49	6.91	72	3.99	148	57.109	260	60.48	57
	26.691	271	75.85	239	6.543	374	48.93	4	7.63	81	2.51	97	57.369	291	61.05	90
	26.962	296	73.46	235	6.917	404	48.89	42	8.44	87	1.54	43	57.660	316	61.95	123
	27.258	313	71.11	226	7.321	423	49.31	88	9.31	91	1.11	11	57.976	333	63.18	150
	27.571	323	68.85	209	7.744	431	50.19	130	10.22	93	1.22	67	58.309	340	64.68	175
	27.894	324	66.76	190	8.175	427	51.49	169	11.15	92	1.89	119	58.649	339	66.43	193
	28.218	318	64.86	163	8.602	414	53.18	205	12.07	89	3.08	169	58.988	330	68.36	210
	28.536	302	63.23	134	9.016	391	55.23	233	12.96	84	4.77	215	59.318	312	70.46	218
	28.838	280	61.89	100	9.407	360	57.56	259	13.80	77	6.92	256	59.630	290	72.64	223
	29.118	252	60.89	65	9.767	322	60.15	277	14.57	69	9.48	291	59.920	260	74.87	221
	29.370	218	60.24	30	10.089	280	62.92	289	15.26	60	12.39	320	60.180	226	77.08	216
	29.588	181	59.94	5	10.369	233	65.81	296	15.86	48	15.59	342	60.406	191	79.24	206
	29.769	143	59.99	39	10.602	185	68.77	297	16.34	38	19.01	359	60.597	153	81.30	193
	29.912	103	60.38	69	10.787	137	71.74	292	16.72	27	22.60	366	60.750	115	83.23	177
	30.015	65	61.07	93	10.924	89	74.66	281	16.99	14	26.26	367	60.865	78	85.00	157
	30.080	28	62.00	114	11.013	42	77.47	265	17.13	2	29.93	361	60.943	45	86.57	138
	30.108	5	63.14	128	11.055	2	80.12	244	17.15	9	33.54	344	60.988	12	87.95	115
	30.103	34	64.42	135	11.053	43	82.56	217	17.06	21	36.98	323	61.000	17	89.10	92
	30.069	59	65.77	136	11.010	82	84.73	188	16.85	31	40.21	292	60.983	42	90.02	67
	30.010	82	67.13	131	10.928	117	86.61	151	16.54	43	43.13	253	60.941	67	90.69	43
	29.928	98	68.44	119	10.811	146	88.12	111	16.11	51	45.66	206	60.874	86	91.12	17
	29.830	110	69.63	106	10.665	174	89.23	69	15.60	59	47.72	155	60.788	103	91.29	7
	29.720	121	70.69	87	10.491	193	89.92	24	15.01	65	49.27	96	60.685	118	91.22	33
	29.599	125	71.56	63	10.298	208	90.16	20	14.36	68	50.23	37	60.567	126	90.89	56
	29.474		72.19		10.090		89.96		13.68		50.60		60.441		90.33	
ce	25.444		90.85		5.617		49.29		8.510		4.64		56.147		57.14	
n δ	*1.054*		*−0.333*		*1.490*		*+1.104*		3.750		+3.615		1.093		+0.441	
	+0.06		*+0.02*		*+0.07*		*−0.07*		+0.08		−0.24		+0.06		−0.03	
	+0.4		*+0.2*		*+0.4*		*+0.2*		+0.4		+0.2		+0.4		+0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	η Cassiopeiæ. Mag. 3.6 Right Ascension.		Declination.		δ Piscium. Mag. 4.6 Right Ascension.		Declination.	
	h m 0 44		° ′ +57 22		h m 0 44		° ′ + 7 8	
	s		″		s		″	
Jan. 0.3	5.127	282	58.92	30	23.511	110	9.06	69
10.2	4.845	284	58.62	82	23.401	110	8.37	72
20.2	4.561	275	57.80	129	23.291	108	7.65	70
30.2	4.286	250	56.51	171	23.183	97	6.95	68
Feb. 9.1	4.036	212	54.80	208	23.086	84	6.27	60
19.1	3.824	165	52.72	234	23.002	60	5.67	48
Mar. 1.1	3.659	106	50.38	251	22.942	33	5.19	35
11.1	3.553	36	47.87	257	22.909	1	4.84	15
21.0	3.517	39	45.30	252	22.908	37	4.69	6
31.0	3.556	117	42.78	237	22.945	79	4.75	31
Apr. 10.0	3.673	195	40.41	212	23.024	120	5.06	57
20.0	3.868	269	38.29	178	23.144	164	5.63	83
29.9	4.137	339	36.51	139	23.308	202	6.46	110
May 9.9	4.476	397	35.12	94	23.510	238	7.56	133
19.9	4.873	447	34.18	45	23.748	270	8.89	157
29.8	5.320	482	33.73	4	24.018	294	10.46	174
June 8.8	5.802	506	33.77	54	24.312	310	12.20	187
18.8	6.308	515	34.31	102	24.622	318	14.07	197
28.8	6.823	513	35.33	147	24.940	320	16.04	202
July 8.7	7.336	497	36.80	188	25.260	311	18.06	199
18.7	7.833	472	38.68	226	25.571	296	20.05	194
28.7	8.305	435	40.94	258	25.867	274	21.99	183
Aug. 7.7	8.740	392	43.52	282	26.141	248	23.82	166
17.6	9.132	341	46.34	304	26.389	215	25.48	148
27.6	9.473	287	49.38	316	26.604	182	26.96	127
Sept. 6.6	9.760	228	52.54	322	26.786	145	28.23	105
16.5	9.988	169	55.76	323	26.931	111	29.28	82
26.5	10.157	110	58.99	319	27.042	74	30.10	58
Oct. 6.5	10.267	52	62.18	304	27.116	43	30.68	37
16.5	10.319	5	65.22	286	27.159	12	31.05	15
26.4	10.314	58	68.08	260	27.171	15	31.20	2
Nov. 5.4	10.256	109	70.68	230	27.156	38	31.18	20
15.4	10.147	154	72.98	192	27.118	59	30.98	33
25.4	9.993	196	74.90	150	27.059	78	30.65	45
Dec. 5.3	9.797	231	76.40	104	26.981	90	30.20	56
15.3	9.566	260	77.44	52	26.891	102	29.64	62
25.3	9.306	278	77.96	0	26.789	110	29.02	71
35.2	9.028		77.96		26.679		28.31	
Mean Place	4.191		35.55		22.471		0.98	
Sec δ, Tan δ	1.855		+1.563		1.008		+0.125	
$D_\psi a$, $D_\omega a$	+0.07		−0.10		+0.06		−0.01	
$D_\psi \delta$, $D_\omega \delta$	+0.4		+0.2		+0.4		+0.2	

Washington Mean Time.	λ Hydri. Mag. 5.0 Right Ascension.		Declination.		20 Ceti. Mag. 4.9 Right Ascension.		Declination.	
	h m 0 45		° ′ −75 21		h m 0 48		° −1[illegible]	
	s		″		s		″	
Jan. 0.3	44.83	80	102.71	65	46.956	110	35.[illegible]	
10.2	44.03	76	102.06	125	46.846	111	36.1[illegible]	
20.2	43.27	72	100.81	181	46.735	108	36.7[illegible]	
30.2	42.55	65	99.00	232	46.627	100	37.2[illegible]	
Feb. 9.1	41.90	55	96.68	278	46.527	85	37.5[illegible]	
19.1	41.35	46	93.90	314	46.442	63	37.77	
Mar. 1.1	40.89	34	90.76	346	46.379	37	37.[illegible]	
11.1	40.55	23	87.30	365	46.342	6	37.6[illegible]	
21.0	40.32	8	83.65	377	46.336	31	37.3[illegible]	
31.0	40.24	4	79.88	383	46.367	71	36.71	
Apr. 10.0	40.28	18	76.05	380	46.438	113	35.[illegible]	
20.0	40.46	30	72.25	368	46.551	155	34.8[illegible]	
29.9	40.76	45	68.57	348	46.706	194	33.4[illegible]	
May 9.9	41.21	55	65.09	323	46.900	230	31.9[illegible]	
19.9	41.76	66	61.86	288	47.130	262	30.25	
29.8	42.42	75	58.98	247	47.392	286	28.36	
June 8.8	43.17	81	56.51	200	47.678	305	26.3[illegible]	
18.8	43.98	88	54.51	150	47.983	314	24.36	
28.8	44.86	90	53.01	94	48.297	316	22.31	
July 8.7	45.76	89	52.07	36	48.613	308	20.31	
18.7	46.65	87	51.71	21	48.921	296	18.40	
28.7	47.52	81	51.92	79	49.217	276	16.64	
Aug. 7.7	48.33	74	52.71	135	49.493	248	15.07	
17.6	49.07	63	54.06	185	49.741	217	13.72	
27.6	49.70	52	55.91	229	49.958	185	12.63	
Sept. 6.6	50.22	37	58.20	266	50.143	148	11.79	
16.5	50.59	22	60.86	291	50.291	112	11.23	
26.5	50.81	7	63.77	308	50.403	77	10.94	
Oct. 6.5	50.88	10	66.85	310	50.480	45	10.88	
16.5	50.78	24	69.95	302	50.525	13	11.06	
26.4	50.54	39	72.97	280	50.538	14	11.42	
Nov. 5.4	50.15	51	75.77	250	50.524	38	11.94	
15.4	49.64	63	78.27	206	50.486	59	12.57	
25.4	49.01	71	80.33	156	50.427	77	13.29	
Dec. 5.3	48.30	77	81.89	98	50.350	91	14.05	
15.3	47.53	80	82.87	38	50.259	102	14.83	76
25.3	46.73	81	83.25	23	50.157	109	15.59	71
35.2	45.92		83.02		50.048		16.30	
Mean Place	43.258		89.58		45.876		40.46	
Sec δ, Tan δ	3.959		−3.831		1.000		−0.023	
$D_\psi a$, $D_\omega a$	+0.04		+0.26		+0.08		0.00	
$D_\psi \delta$, $D_\omega \delta$	+0.4		+0.2		+0.4		+0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

τ Piscium. Mag. 4.7				ζ Piscium. Mag. 5.6				κ Tucanae. Mag. 5.0				f Piscium. Mag. 5.3			
Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.	
h m		° ′		h m		° ′		h m		° ′		h m		° ′	
1 7		+29 38		1 9		+ 7 8		1 12		−69 18		1 13		+ 3 10	
s		″		s		″		s		″		s		″	
6.276		73.39		24.792		20.55		59.02		73.55		32.212		46.46	
6.140	136	72.90	49	24.683	109	19.88	67	58.47	55	73.43	12	32.103	109	45.77	69
5.997	143	72.15	75	24.567	116	19.20	68	57.92	55	72.72	71	31.986	117	45.11	66
5.853	144	71.17	98	24.450	117	18.53	67	57.39	53	71.42	130	31.869	117	44.52	59
5.716	137	69.98	119	24.339	111	17.89	64	56.90	49	69.58	184	31.757	112	43.99	53
5.595	121	68.66	132	24.239	100	17.32	57	56.46	44	67.26	232	31.653	104	43.58	41
5.495	100	67.25	141	24.159	80	16.86	46	56.08	38	64.51	275	31.569	84	43.29	29
5.428	67	65.84	141	24.102	57	16.53	33	55.78	30	61.41	310	31.509	60	43.19	10
5.399	29	64.47	137	24.078	24	16.38	15	55.57	21	58.03	338	31.481	28	43.26	7
5.413	14	63.24	123	24.091	13	16.42	4	55.44	13	54.42	361	31.488	7	43.53	27
5.475	62	62.17	107	24.145	54	16.71	29	55.40	4	50.70	372	31.535	47	44.05	52
5.588	113	61.37	80	24.241	96	17.23	52	55.46	6	46.94	376	31.623	88	44.81	76
5.750	162	60.85	52	24.380	139	18.01	78	55.63	17	43.20	374	31.759	136	45.80	99
5.959	209	60.66	19	24.562	182	19.03	102	55.90	27	39.58	362	31.935	176	47.04	124
6.212	253	60.82	16	24.783	221	20.31	128	56.25	35	36.17	341	32.148	213	48.49	145
6.500	288	61.32	50	25.037	254	21.79	148	56.69	44	33.02	315	32.398	250	50.13	164
6.820	320	62.17	85	25.318	281	23.46	167	57.21	52	30.21	281	32.675	277	51.94	181
7.159	339	63.34	117	25.621	303	25.26	180	57.79	58	27.82	239	32.972	297	53.83	189
7.512	353	64.81	147	25.936	315	27.16	190	58.42	63	25.90	192	33.281	309	55.77	194
7.867	355	66.53	172	26.254	318	29.10	194	59.07	65	24.50	140	33.596	315	57.73	196
8.216	349	68.44	191	26.570	316	31.04	194	59.74	67	23.65	85	33.910	314	59.66	193
8.553	337	70.53	209	26.873	303	32.93	189	60.40	66	23.38	27	34.213	303	61.49	183
8.868	315	72.71	218	27.160	287	34.71	178	61.03	63	23.71	33	34.498	285	63.15	166
9.157	289	74.95	224	27.423	263	36.33	162	61.62	59	24.62	91	34.762	264	64.66	151
9.413	256	77.19	224	27.658	235	37.78	145	62.14	52	26.06	144	34.999	237	65.96	130
9.636	223	79.40	221	27.861	203	39.02	124	62.58	44	28.00	194	35.204	205	67.00	104
9.822	186	81.53	213	28.031	170	40.04	102	62.93	35	30.36	236	35.375	171	67.82	82
9.970	148	83.54	201	28.167	136	40.82	78	63.17	24	33.08	272	35.512	137	68.37	55
10.081	111	85.40	186	28.268	101	41.38	56	63.31	14	36.04	296	35.616	104	68.68	31
10.155	74	87.08	168	28.336	68	41.72	34	63.34	3	39.13	309	35.687	71	68.77	9
10.196	41	88.57	149	28.374	38	41.85	13	63.26	8	42.22	309	35.728	41	68.65	12
10.204	8	89.83	126	28.382	8	41.80	5	63.06	20	45.20	298	35.738	10	68.36	29
10.181	23	90.86	103	28.365	17	41.58	22	62.78	28	47.96	276	35.725	13	67.94	42
10.133	48	91.63	77	28.325	40	41.23	35	62.41	37	50.36	240	35.686	39	67.40	54
10.058	75	92.15	52	28.265	60	40.77	46	61.97	44	52.32	196	35.625	61	66.78	62
9.961	97	92.37	22	28.185	80	40.22	55	61.47	50	53.78	146	35.547	78	66.08	70
9.843	118	92.32	5	28.090	95	39.60	62	60.94	53	54.66	88	35.453	94	65.39	69
9.712	131	91.98	34	27.983	107	38.93	67	60.39	55	54.94	28	35.347	106	64.68	71
5.091		57.55		23.597		12.37		57.309		61.27		30.988		39.65	
1.151		+0.569		1.008		+0.125		2.831		−2.648		1.002		+0.056	
+0.07		−0.04		+0.06		−0.01		+0.04		+0.18		+0.06		0.00	
+0.4		+0.3		+0.4		+0.3		+0.4		+0.3		+0.4		+0.3	

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FOR THE UPPER TRANSIT AT .

FOR THE UPPER TRANSIT AT WASHINGTON.

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FOR THE UPPER TRANSIT AT .

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FOR THE UPPER TRANSIT AT WASHINGTON.

hington n Time.	ξ Piscium. Mag. 4.8 Right Ascension.		Declination.		β Arietis. Mag. 2.7 Right Ascension.		Declination.	
	h m		° ′		h m		° ′	
	1 49		+ 2 46		1 50		+20 24	
	s		″		s		″	
. 0.3	16.855		48.36		4.536		22.54	
10.3	16.750	105	47.67	69	4.423	113	22.13	41
20.2	16.631	119	47.02	65	4.295	128	21.56	57
30.2	16.505	126	46.43	59	4.158	137	20.85	71
b. 9.2	16.377	128	45.92	51	4.020	138	20.05	80
19.2	16.254	123	45.53	39	3.887	133	19.17	88
r. 1.1	16.145	109	45.28	25	3.769	118	18.26	91
11.1	16.055	90	45.17	11	3.672	97	17.37	89
21.1	15.994	61	45.24	7	3.607	65	16.54	83
31.1	15.967	27	45.52	28	3.580	27	15.83	71
r. 10.0	15.979	12	46.01	49	3.595	15	15.28	55
20.0	16.034	55	46.73	72	3.657	62	14.93	35
30.0	16.134	100	47.68	95	3.767	110	14.82	11
y 9.9	16.277	143	48.87	119	3.924	157	14.98	16
19.9	16.461	184	50.25	138	4.126	202	15.40	42
29.9	16.685	224	51.83	158	4.367	241	16.11	71
ne 8.9	16.941	256	53.55	172	4.642	275	17.07	96
18.8	17.222	281	55.38	183	4.944	302	18.27	120
28.8	17.522	300	57.27	189	5.265	321	19.68	141
ly 8.8	17.833	311	59.18	191	5.596	331	21.27	159
18.8	18.147	314	61.04	186	5.929	333	22.97	170
28.7	18.457	310	62.81	177	6.258	329	24.75	178
g. 7.7	18.754	297	64.43	162	6.574	316	26.57	182
17.7	19.034	280	65.88	145	6.871	297	28.38	181
27.6	19.291	257	67.11	123	7.145	274	30.14	176
pt. 6.6	19.523	232	68.11	100	7.391	246	31.79	165
16.6	19.724	201	68.85	74	7.606	215	33.34	155
26.6	19.894	170	69.34	49	7.791	185	34.74	140
ct. 6.5	20.033	139	69.57	23	7.942	151	35.97	123
16.5	20.140	107	69.58	1	8.060	118	37.03	106
26.5	20.216	76	69.38	20	8.147	87	37.91	88
ov. 5.5	20.264	48	69.00	38	8.203	56	38.60	69
15.4	20.282	18	68.49	51	8.229	26	39.12	52
25.4	20.274	8	67.87	62	8.226	3	39.47	35
ec. 5.4	20.239	35	67.18	69	8.194	32	39.63	16
15.3	20.182	57	66.44	74	8.136	58	39.62	1
25.3	20.101	81	65.69	75	8.053	83	39.44	18
35.3	20.003	98	64.95	74	7.948	105	39.10	34
n Place	15.422		41.75		3.057		10.04	
: δ, Tan δ	1.001		+0.049		1.067		+0.372	
, $D_w \alpha$	+0.06		0.00		+0.07		−0.02	
$D_w \delta$	+0.4		+0.5		+0.4		+0.5	

hington n Time.	ψ Phœnicis. Mag. 4.4 Right Ascension.		Declination.		υ Ceti. Mag. 4.2 Right Ascension.		Declination.	
	h m		° ′		h m		° ′	
	1 50		−46 41		1 56		−21 28	
	s		″		s		″	
. 0.3	20.591		100.86		7.101		47.42	
10.3	20.361	230	101.63	77	6.971	130	48.34	92
20.2	20.121	240	101.90	27	6.828	143	48.94	60
30.2	19.877	244	101.65	25	6.678	150	49.23	29
b. 9.2	19.637	240	100.90	75	6.527	151	49.20	3
19.2	19.411	226	99.67	123	6.382	145	48.84	36
r. 1.1	19.207	204	97.99	168	6.249	133	48.15	69
11.1	19.031	176	95.91	208	6.138	111	47.15	100
21.1	18.895	136	93.46	245	6.054	84	45.84	131
31.1	18.805	90	90.71	275	6.005	49	44.24	160
r. 10.0	18.765	40	87.70	301	5.996	9	42.39	185
20.0	18.780	15	84.52	318	6.030	34	40.30	209
30.0	18.853	73	81.21	331	6.110	80	38.02	228
y 9.9	18.984	131	77.85	336	6.236	126	35.59	243
19.9	19.172	188	74.51	334	6.407	171	33.06	253
29.9	19.411	239	71.27	324	6.618	211	30.47	259
ne 8.9	19.697	286	68.22	305	6.866	248	27.91	256
18.8	20.022	325	65.41	281	7.142	276	25.41	250
28.8	20.378	356	62.93	248	7.442	300	23.05	236
ly 8.8	20.755	377	60.84	209	7.756	314	20.90	215
18.8	21.144	389	59.19	165	8.076	320	19.00	190
28.7	21.533	389	58.03	116	8.396	320	17.42	158
g. 7.7	21.913	380	57.40	63	8.703	307	16.20	122
17.7	22.273	360	57.30	10	8.996	293	15.36	84
27.6	22.605	332	57.76	46	9.267	271	14.94	42
pt. 6.6	22.900	295	58.74	98	9.510	243	14.92	2
16.6	23.152	252	60.21	147	9.722	212	15.32	40
26.6	23.356	204	62.10	189	9.899	177	16.10	78
ct. 6.5	23.509	153	64.36	226	10.042	143	17.22	112
16.5	23.609	100	66.89	253	10.149	107	18.61	139
26.5	23.657	48	69.59	270	10.220	71	20.21	160
ov. 5.5	23.652	5	72.35	276	10.257	37	21.96	175
15.4	23.601	51	75.06	271	10.263	6	23.78	182
25.4	23.506	95	77.61	255	10.237	26	25.58	180
ec. 5.4	23.370	136	79.92	231	10.183	54	27.30	172
15.3	23.199	171	81.88	196	10.102	81	28.86	156
25.3	22.999	200	83.43	155	10.000	102	30.22	136
35.3	22.778	221	84.53	110	9.877	123	31.33	111
n Place	19.001		92.87		5.618		46.13	
: δ, Tan δ	1.458		−1.062		1.075		−0.393	
, $D_w \alpha$	+0.05		+0.06		+0.06		+0.02	
$D_w \delta$	+0.4		+0.5		+0.3		+0.5	

FOR THE UPPER TRANSIT AT .

FOR THE UPPER TRANSIT AT WASHINGTON.

ington Time.	β Trianguli. Mag. 3.1 Right Ascension.	Diff.	Declination.	Diff.	55 Cassiopeiæ. Mag. 6.2 Right Ascension.	Diff.	Declination.	Diff.	6 Persei. Mag. 5.4 Right Ascension.	Diff.	Declination.	Diff.	ξ¹ Ceti. Mag. 4.5 Right Ascension.	Diff.	Declination.	Diff.
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	2 4		+34 35		2 7		+66 8		2 8		+50 40		2 8		+ 8 27	
	s		″		s		″		s		″		s		″	
0.3	37.638	132	59.59	2	59.43	36	33.94	89	6.488	194	71.92	45	37.464	100	36.46	61
10.3	37.506	153	59.57	31	59.07	40	34.83	35	6.294	222	72.37	2	37.364	119	35.85	62
20.3	37.353	167	59.26	60	58.67	43	35.18	19	6.072	240	72.39	42	37.245	129	35.23	62
30.2	37.186	171	58.66	84	58.24	43	34.99	73	5.832	244	71.97	84	37.116	134	34.61	58
. 9.2	37.015	166	57.82	107	57.81	41	34.26	124	5.588	237	71.13	121	36.982	132	34.03	54
19.2	36.849	152	56.75	126	57.40	38	33.02	169	5.351	216	69.92	154	36.850	121	33.49	46
. 1.1	36.697	127	55.49	136	57.02	32	31.33	208	5.135	182	68.38	178	36.729	104	33.03	35
11.1	36.570	92	54.13	142	56.70	23	29.25	234	4.953	137	66.60	198	36.625	77	32.68	21
21.1	36.478	50	52.71	141	56.47	16	26.91	255	4.816	81	64.62	207	36.548	45	32.47	6
31.1	36.428	2	51.30	132	56.31	6	24.36	263	4.735	18	62.55	208	36.503	5	32.41	15
. 10.0	36.426	52	49.98	117	56.25	5	21.73	259	4.717	51	60.47	199	36.498	38	32.56	34
20.0	36.478	106	48.81	97	56.30	15	19.14	247	4.768	120	58.48	183	36.536	84	32.90	57
30.0	36.584	160	47.84	71	56.45	27	16.67	226	4.888	190	56.65	157	36.620	129	33.47	81
10.0	36.744	211	47.13	43	56.72	35	14.41	196	5.078	253	55.08	129	36.749	172	34.28	102
19.9	36.955	258	46.70	11	57.07	45	12.45	160	5.331	313	53.79	94	36.921	212	35.30	124
29.9	37.213	297	46.59	22	57.52	52	10.85	119	5.644	363	52.85	55	37.133	247	36.54	141
e 8.9	37.510	328	46.81	53	58.04	57	9.66	74	6.007	402	52.30	17	37.380	275	37.95	156
18.8	37.838	352	47.34	85	58.61	62	8.92	28	6.409	432	52.13	25	37.655	298	39.51	169
28.8	38.190	365	48.19	113	59.23	66	8.64	19	6.841	451	52.38	63	37.953	310	41.20	174
r 8.8	38.555	371	49.32	138	59.89	66	8.83	66	7.292	459	53.01	101	38.263	316	42.94	176
18.8	38.926	367	50.70	160	60.55	66	9.49	110	7.751	456	54.02	134	38.579	314	44.70	172
28.7	39.293	356	52.30	176	61.21	65	10.59	153	8.207	442	55.36	167	38.893	305	46.42	164
. 7.7	39.649	339	54.06	189	61.86	62	12.12	190	8.649	424	57.03	194	39.198	292	48.06	153
17.7	39.988	315	55.95	198	62.48	58	14.02	224	9.073	395	58.97	217	39.490	272	49.59	137
27.7	40.303	287	57.93	202	63.06	54	16.26	254	9.468	362	61.14	233	39.762	246	50.96	117
t. 6.6	40.590	255	59.95	203	63.60	47	18.80	278	9.830	322	63.47	247	40.008	219	52.13	97
16.6	40.845	222	61.98	198	64.07	41	21.58	296	10.152	283	65.94	257	40.227	191	53.10	74
26.6	41.067	188	63.96	191	64.48	35	24.54	310	10.435	237	68.51	258	40.418	160	53.84	53
. 6.5	41.255	151	65.87	182	64.83	27	27.64	315	10.672	192	71.09	257	40.578	130	54.37	30
16.5	41.406	115	67.69	168	65.10	19	30.79	315	10.864	145	73.66	251	40.708	98	54.67	11
26.5	41.521	80	69.37	153	65.29	12	33.94	308	11.009	97	76.17	240	40.806	69	54.78	6
v. 5.5	41.601	45	70.90	136	65.41	4	37.02	295	11.106	48	78.57	224	40.875	40	54.72	23
15.4	41.646	8	72.26	115	65.45	4	39.97	275	11.154	1	80.81	200	40.915	10	54.49	35
25.4	41.654	27	73.41	94	65.41	13	42.72	245	11.153	49	82.81	175	40.925	17	54.14	44
c. 5.4	41.627	60	74.35	67	65.28	21	45.17	209	11.104	94	84.56	145	40.908	43	53.70	52
15.4	41.567	91	75.02	42	65.07	27	47.26	168	11.010	139	86.01	107	40.865	69	53.18	58
25.3	41.476	121	75.44	13	64.80	33	48.94	119	10.871	177	87.08	68	40.796	90	52.60	62
35.3	41.355		75.57		64.47		50.13		10.694		87.76		40.706		51.98	
n Place	35.965		42.98		56.952		10.27		4.556		51.26		35.910		28.09	
δ, Tan δ	1.215		+0.690		2.472		+2.261		1.578		+1.221		1.011		+0.149	
$D_\mu a$	+0.07		−0.04		+0.09		−0.13		+0.08		−0.07		+0.06		−0.01	
$D_\mu \delta$	+0.3		+0.5		+0.3		+0.5		+0.3		+0.5		+0.3		+0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	μ Fornacis. Mag. 5.2 Right Ascension.		μ Fornacis. Declination.		γ Trianguli. Mag. 4.1 Right Ascension.		γ Trianguli. Declination.		67 Ceti. Mag. 5.7 Right Ascension.		67 Ceti. Declination.		φ Erida[ni] Mag. 3. Right Ascension.	
	h m		° ′		h m		° ′		h m		° ′		h m	
	2 9		−31 6		2 12		+33 27		2 12		− 6 47		2 13	
	s		″		s		″		s		″		s	
Jan. 0.3	16.491	153	50.96	103	24.214	127	66.32	0	52.088	105	71.66	88	34.352	266
10.3	16.338	169	51.99	64	24.087	147	66.32	28	51.983	122	72.54	71	34.086	283
20.3	16.169	177	52.63	24	23.940	164	66.04	54	51.861	133	73.25	55	33.803	293
30.2	15.992	181	52.87	17	23.776	170	65.50	79	51.728	139	73.80	35	33.510	292
Feb. 9.2	15.811	176	52.70	58	23.606	166	64.71	100	51.589	137	74.15	14	33.218	283
19.2	15.635	162	52.12	96	23.440	155	63.71	118	51.452	128	74.29	6	32.935	262
Mar. 1.2	15.473	142	51.16	134	23.285	130	62.53	128	51.324	109	74.23	30	32.673	233
11.1	15.331	112	49.82	168	23.155	100	61.25	134	51.215	86	73.93	52	32.440	193
21.1	15.219	77	48.14	201	23.055	57	59.91	134	51.129	53	73.41	77	32.247	146
31.1	15.142	35	46.13	228	22.998	10	58.57	125	51.076	15	72.64	100	32.101	91
Apr. 10.0	15.107	9	43.85	252	22.988	42	57.32	111	51.061	27	71.64	124	32.010	33
20.0	15.116	59	41.33	271	23.030	97	56.21	93	51.088	71	70.40	146	31.977	30
30.0	15.175	108	38.62	283	23.127	149	55.28	67	51.159	116	68.94	167	32.007	96
May 10.0	15.283	157	35.79	291	23.276	202	54.61	41	51.275	159	67.27	183	32.103	158
19.9	15.440	201	32.88	292	23.478	247	54.20	10	51.434	199	65.44	196	32.261	218
29.9	15.641	242	29.96	285	23.725	286	54.10	22	51.633	234	63.48	206	32.479	273
June 8.9	15.883	276	27.11	273	24.011	321	54.32	51	51.867	265	61.42	210	32.752	321
18.9	16.159	302	24.38	252	24.332	346	54.83	83	52.132	286	59.32	209	33.073	362
28.8	16.461	321	21.86	225	24.678	359	55.66	108	52.418	302	57.23	202	33.435	390
July 8.8	16.782	332	19.61	192	25.037	366	56.74	132	52.720	309	55.21	189	33.825	409
18.8	17.114	335	17.69	154	25.403	365	58.06	154	53.029	309	53.32	171	34.234	418
28.7	17.449	328	16.15	111	25.768	354	59.60	171	53.338	301	51.61	150	34.652	415
Aug. 7.7	17.777	313	15.04	65	26.122	338	61.31	181	53.639	288	50.11	122	35.067	401
17.7	18.090	293	14.39	17	26.460	317	63.12	191	53.927	269	48.89	93	35.468	374
27.7	18.383	265	14.22	30	26.777	290	65.03	193	54.196	245	47.96	61	35.842	340
Sept. 6.6	18.648	233	14.52	77	27.067	260	66.96	193	54.441	218	47.35	28	36.182	299
16.6	18.881	197	15.29	119	27.327	227	68.89	189	54.659	189	47.07	3	36.481	249
26.6	19.078	160	16.48	156	27.554	193	70.78	183	54.848	158	47.10	34	36.730	195
Oct. 6.6	19.238	120	18.04	187	27.747	159	72.61	172	55.006	126	47.44	60	36.925	137
16.5	19.358	81	19.91	211	27.906	123	74.33	159	55.132	96	48.04	82	37.062	77
26.5	19.439	42	22.02	224	28.029	89	75.92	145	55.228	65	48.86	99	37.139	21
Nov. 5.5	19.481	5	24.26	228	28.118	52	77.37	129	55.293	34	49.85	112	37.160	38
15.4	19.486	31	26.54	225	28.170	18	78.66	109	55.327	6	50.97	120	37.122	91
25.4	19.455	64	28.79	210	28.188	18	79.75	89	55.333	23	52.17	120	37.031	139
Dec. 5.4	19.391	93	30.89	190	28.170	51	80.64	64	55.310	48	53.37	116	36.892	185
15.4	19.298	121	32.79	161	28.119	83	81.28	41	55.262	74	54.53	109	36.707	223
25.3	19.177	144	34.40	128	28.036	114	81.69	14	55.188	96	55.62	98	36.484	253
35.3	19.033		35.68		27.922		81.83		55.092		56.60		36.231	
Mean Place	14.907		47.04		22.490		50.23		50.533		75.03		32.555	
Sec δ, Tan δ	1.168		−0.604		1.199		+0.661		1.007		−0.119		1.620	
$D_\psi a$, $D_\omega a$	+0.05		+0.03		+0.07		−0.04		+0.06		+0.01		+0.04	
$D_\psi \delta$, $D_\omega \delta$	+0.3		+0.5		+0.3		+0.5		+0.3		+0.5		+0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

...ion ...e.	o Ceti. (*Mira.*) Var. 1.7–9.6				κ Fornacis. Mag. 5.4				δ Hydri. Mag. 4.3				ι Cassiopeiæ. Mag. 4.6			
	Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	2 15		− 3 20		2 18		−24 11		2 20		−69 1		2 22		+67 1	
	s		″		s		″		s		″		s		″	
.3	10.717	101	69.37	83	46.250	131	37.21	108	18.41	55	83.20	89	15.31	37	71.72	107
.3	10.616	120	70.20	71	46.119	148	38.29	76	17.86	57	84.09	28	14.94	41	72.79	55
.3	10.496	130	70.91	58	45.971	160	39.05	41	17.29	59	84.37	31	14.53	44	73.34	1
.2	10.366	137	71.49	41	45.811	164	39.46	5	16.70	58	84.06	91	14.09	45	73.33	54
.2	10.229	136	71.90	24	45.646	162	39.51	30	16.12	56	83.15	146	13.64	44	72.79	107
.2	10.093	127	72.14	7	45.484	153	39.21	67	15.56	52	81.69	197	13.20	41	71.72	154
.2	9.966	110	72.21	15	45.331	134	38.54	100	15.04	46	79.72	243	12.79	35	70.18	194
.1	9.856	84	72.06	35	45.197	109	37.54	133	14.58	41	77.29	281	12.44	27	68.24	225
.1	9.772	53	71.71	57	45.088	75	36.21	164	14.17	32	74.48	316	12.17	20	65.99	248
.1	9.719	16	71.14	81	45.013	36	34.57	191	13.85	24	71.32	340	11.97	9	63.51	261
.0	9.703	26	70.33	102	44.977	7	32.66	216	13.61	14	67.92	360	11.88	1	60.90	261
.0	9.729	71	69.31	126	44.984	53	30.50	237	13.47	3	64.32	369	11.89	13	58.29	253
.0	9.800	115	68.05	146	45.037	101	28.13	253	13.44	7	60.63	371	12.02	23	55.76	235
.0	9.915	158	66.59	165	45.138	147	25.60	263	13.51	17	56.92	365	12.25	34	53.41	209
9.9	10.073	199	64.94	178	45.285	190	22.97	269	13.68	27	53.27	350	12.59	43	51.32	175
9.9	10.272	233	63.16	191	45.475	229	20.28	267	13.95	36	49.77	328	13.02	51	49.57	138
8.9	10.505	264	61.25	198	45.704	264	17.61	259	14.31	44	46.49	297	13.53	58	48.19	94
8.9	10.769	285	59.27	199	45.968	289	15.02	246	14.75	53	43.52	258	14.11	63	47.25	49
8.8	11.054	302	57.28	195	46.257	309	12.56	224	15.28	57	40.94	214	14.74	67	46.76	2
8.8	11.356	308	55.33	187	46.566	319	10.32	197	15.85	62	38.80	163	15.41	68	46.74	44
18.8	11.664	309	53.46	172	46.885	321	8.35	165	16.47	63	37.17	107	16.09	69	47.18	89
28.7	11.973	301	51.74	152	47.206	316	6.70	128	17.10	65	36.10	47	16.78	68	48.07	131
7.7	12.274	289	50.22	129	47.522	304	5.42	86	17.75	63	35.63	13	17.46	66	49.38	171
17.7	12.563	270	48.93	103	47.826	285	4.56	44	18.38	59	35.76	71	18.12	62	51.09	207
27.7	12.833	246	47.90	73	48.111	261	4.12	1	18.97	55	36.47	132	18.74	57	53.16	237
6.6	13.079	221	47.17	45	48.372	232	4.13	45	19.52	47	37.79	185	19.31	52	55.53	265
16.6	13.300	190	46.72	13	48.604	200	4.58	86	19.99	39	39.64	234	19.83	46	58.18	284
26.6	13.490	161	46.59	15	48.804	165	5.44	122	20.38	30	41.98	274	20.29	39	61.02	302
6.6	13.651	131	46.74	40	48.969	130	6.66	155	20.68	20	44.72	303	20.68	32	64.04	310
16.5	13.782	98	47.14	63	49.099	94	8.21	177	20.88	9	47.75	321	21.00	24	67.14	313
26.5	13.880	68	47.77	81	49.193	59	9.98	195	20.97	3	50.96	327	21.24	15	70.27	308
5.5	13.948	40	48.58	93	49.252	24	11.93	203	20.94	12	54.23	320	21.39	8	73.35	300
15.4	13.988	9	49.51	102	49.276	9	13.96	202	20.82	23	57.43	301	21.47	1	76.35	282
25.4	13.997	18	50.53	105	49.267	40	15.98	194	20.59	32	60.44	270	21.46	10	79.17	254
5.4	13.979	44	51.58	105	49.227	71	17.92	180	20.27	40	63.14	230	21.36	18	81.71	222
15.4	13.935	70	52.63	100	49.156	97	19.72	156	19.87	48	65.44	182	21.18	26	83.93	183
25.3	13.865	93	53.63	91	49.059	122	21.28	128	19.39	52	67.26	127	20.92	34	85.76	136
35.3	13.772		54.54		48.937		22.56		18.87		68.53		20.58		87.12	
...lace	9.150		73.83		44.646		35.30		16.017		72.48		12.509		48.50	
...an δ	1.002		−0.058		1.096		−0.449		2.795		−2.610		2.563		+2.360	
... α	+0.06		0.00		+0.05		+0.02		+0.02		+0.14		+0.10		−0.13	
... δ	+0.3		+0.6		+0.3		+0.6		+0.3		+0.6		+0.3		+0.8	

FOR THE UPPER TRANSIT AT .

FOR THE UPPER TRANSIT AT WASHINGTON.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	θ Persei. Mag. 4.2 Right Ascension.		θ Persei. Declination.		γ Ceti seq. Mag. 3.7 Right Ascension.		γ Ceti seq. Declination.		π Ceti. Mag. 4.4 Right Ascension.		π Ceti. Declination.		μ Ce Mag. Right Ascension.	
	h m 2 38		° ′ +48 52		h m 2 38		° ′ + 2 53		h m 2 40		° ′ −14 12		h m 2 40	
	s		″		s		″		s		″		s	
Jan. 0.3	33.574	164	60.96	66	61.581	91	18.20	74	11.960	105	33.41	110	28.894	88
10.3	33.410	197	61.56	26	61.490	113	17.46	68	11.855	128	34.51	87	28.806	112
20.3	33.213	224	61.82	13	61.377	130	16.78	61	11.727	143	35.38	61	28.694	129
30.3	32.989	237	61.69	53	61.247	139	16.17	52	11.584	152	35.99	34	28.565	141
Feb. 9.2	32.752	239	61.16	90	61.108	143	15.65	42	11.432	155	36.33	7	28.424	144
19.2	32.513	228	60.26	124	60.965	138	15.23	26	11.277	150	36.40	23	28.280	139
Mar. 1.2	32.285	202	59.02	152	60.827	124	14.97	14	11.127	137	36.17	50	28.141	124
11.1	32.083	163	57.50	173	60.703	102	14.83	3	10.990	113	35.67	80	28.017	103
21.1	31.920	115	55.77	187	60.601	72	14.86	22	10.877	83	34.87	107	27.914	71
31.1	31.805	57	53.90	192	60.529	35	15.08	41	10.794	48	33.80	133	27.843	34
Apr. 10.1	31.748	10	51.98	189	60.494	6	15.49	63	10.746	6	32.47	158	27.809	8
20.0	31.758	75	50.09	178	60.500	50	16.12	84	10.740	38	30.89	180	27.817	54
30.0	31.833	144	48.31	160	60.550	96	16.96	105	10.778	84	29.09	200	27.871	101
May 10.0	31.977	209	46.71	136	60.646	140	18.01	124	10.862	130	27.09	217	27.972	146
20.0	32.186	269	45.35	106	60.786	183	19.25	143	10.992	172	24.92	226	28.118	187
29.9	32.455	322	44.29	73	60.969	220	20.68	157	11.164	211	22.66	233	28.305	226
June 8.9	32.777	368	43.56	38	61.189	252	22.25	170	11.375	245	20.33	233	28.531	258
18.9	33.145	402	43.18	2	61.441	277	23.95	175	11.620	271	18.00	228	28.789	283
28.8	33.547	426	43.16	34	61.718	295	25.70	178	11.891	291	15.72	216	29.072	303
July 8.8	33.973	440	43.50	70	62.013	307	27.48	174	12.182	305	13.56	198	29.375	312
18.8	34.413	446	44.20	103	62.320	309	29.22	167	12.487	308	11.58	174	29.687	315
28.8	34.859	441	45.23	132	62.629	305	30.89	154	12.795	306	9.84	147	30.002	312
Aug. 7.7	35.300	428	46.55	159	62.934	296	32.43	137	13.101	298	8.37	113	30.314	301
17.7	35.728	406	48.14	181	63.230	281	33.80	115	13.399	283	7.24	77	30.615	287
27.7	36.134	381	49.95	200	63.511	260	34.95	93	13.682	262	6.47	39	30.902	267
Sept. 6.7	36.515	319	51.95	215	63.771	238	35.88	67	13.944	239	6.08	1	31.169	244
16.6	36.864	313	54.10	225	64.009	211	36.55	40	14.183	211	6.07	37	31.413	218
26.6	37.177	276	56.35	231	64.220	185	36.95	15	14.394	182	6.44	72	31.631	191
Oct. 6.6	37.453	234	58.66	233	64.405	155	37.10	8	14.576	151	7.16	102	31.822	162
16.5	37.687	190	60.99	231	64.560	125	37.02	32	14.727	119	8.18	129	31.984	133
26.5	37.877	144	63.30	221	64.685	97	36.70	48	14.846	88	9.47	147	32.117	103
Nov. 5.5	38.021	97	65.54	212	64.782	66	36.22	62	14.934	55	10.94	160	32.220	73
15.5	38.118	49	67.66	197	64.848	36	35.60	74	14.989	23	12.54	166	32.293	43
25.4	38.167	2	69.63	177	64.884	7	34.86	79	15.012	7	14.20	163	32.336	12
Dec. 5.4	38.165	50	71.40	151	64.891	21	34.07	83	15.005	38	15.83	157	32.348	18
15.4	38.115	98	72.91	120	64.867	52	33.24	83	14.967	67	17.40	144	32.330	47
25.4	38.017	142	74.11	86	64.815	79	32.41	80	14.900	94	18.84	125	32.283	77
35.3	37.875		74.97		64.736		31.61		14.806		20.09		32.206	
Mean Place	31.361		41.76		59.876		11.96		10.269		34.51		27.153	
Sec δ, Tan δ	1.520		+1.146		1.001		+0.050		1.031		−0.253		1.015	
$D_\psi \alpha$, $D_\omega \alpha$	+0.08		−0.06		+0.06		0.00		+0.06		+0.01		+0.06	
$D_\psi \delta$, $D_\omega \delta$	+0.5		+0.6		+0.3		+0.6		+0.3		+0.6		+0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

...ington ... Time.	η Persei. Mag. 3.9 Right Ascension.		Declination.		41 Arietis. Mag. 3.7 Right Ascension.		Declination.		β Fornacis. Mag. 4.5 Right Ascension.		Declination.		σ Arietis. Mag. 5.5 Right Ascension.		Declination.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	2 44		+55 33		2 45		+26 55		2 45		−32 44		2 46		+14 44	
	s		″		s		″		s		″		s		″	
. 0.3	40.440		27.33		7.526		22.46		38.788		78.37		56.230		36.03	
10.3	40.242	198	28.27	94	7.428	98	22.43	3	38.640	148	79.75	138	56.144	86	35.61	42
20.3	40.001	241	28.76	49	7.303	125	22.20	23	38.469	171	80.72	97	56.032	112	35.13	48
30.3	39.729	272	28.81	5	7.157	146	21.79	41	38.282	187	81.27	55	55.901	131	34.60	53
. 9.2	39.440	289	28.41	40	6.997	160	21.22	57	38.085	197	81.38	11	55.757	144	34.04	56
19.2	39.149	291	27.58	83	6.833	164	20.49	73	37.886	199	81.07	31	55.608	149	33.46	58
. 1.2	38.870	279	26.33	125	6.675	158	19.64	85	37.693	193	80.33	74	55.464	144	32.89	57
11.1	38.621	249	24.75	158	6.532	143	18.71	93	37.516	177	79.19	114	55.333	131	32.35	54
21.1	38.415	206	22.91	184	6.415	117	17.75	96	37.365	151	77.66	153	55.225	108	31.88	47
31.1	38.265	150	20.86	205	6.333	82	16.80	95	37.246	119	75.79	187	55.147	78	31.51	37
. 10.1	38.183	82	18.70	216	6.292	41	15.92	88	37.166	80	73.60	219	55.107	40	31.28	23
20.0	38.174	9	16.53	217	6.299	7	15.16	76	37.133	33	71.15	245	55.110	3	31.21	7
30.0	38.242	68	14.45	208	6.356	57	14.56	60	37.147	14	68.47	268	55.160	50	31.32	11
y 10.0	38.390	148	12.50	195	6.464	108	14.16	40	37.211	64	65.62	285	55.257	97	31.65	33
20.0	38.611	221	10.80	170	6.623	159	14.00	16	37.326	115	62.67	295	55.400	143	32.19	54
29.9	38.904	293	9.36	144	6.828	205	14.07	7	37.490	164	59.68	299	55.586	186	32.95	76
ne 8.9	39.257	353	8.27	109	7.074	246	14.41	34	37.698	208	56.71	297	55.812	226	33.91	96
18.9	39.664	407	7.55	72	7.356	282	14.98	57	37.945	247	53.85	286	56.071	259	35.05	114
28.8	40.112	448	7.21	34	7.666	310	15.80	82	38.225	280	51.17	268	56.356	285	36.34	129
ly 8.8	40.591	479	7.26	5	7.995	329	16.82	102	38.531	306	48.72	245	56.662	306	37.75	141
18.8	41.089	498	7.69	43	8.336	341	18.03	121	38.853	322	46.60	212	56.978	316	39.23	148
28.8	41.594	505	8.51	82	8.682	346	19.38	135	39.185	332	44.85	175	57.299	321	40.75	152
ug. 7.7	42.096	502	9.68	117	9.024	342	20.83	145	39.518	333	43.54	131	57.617	318	42.26	151
17.7	42.584	488	11.16	148	9.356	332	22.35	152	39.844	326	42.69	85	57.926	309	43.71	145
27.7	43.051	467	12.93	177	9.672	316	23.90	155	40.154	310	42.33	36	58.221	295	45.08	137
ept. 6.7	43.490	439	14.96	203	9.968	296	25.44	154	40.445	291	42.49	16	58.496	275	46.31	123
16.6	43.894	404	17.18	222	10.240	272	26.94	150	40.708	263	43.14	65	58.749	253	47.40	109
26.6	44.258	364	19.55	237	10.485	245	28.36	142	40.940	232	44.26	112	58.977	228	48.32	92
ct. 6.6	44.579	321	22.04	249	10.701	216	29.70	134	41.138	198	45.81	155	59.177	200	49.05	73
16.5	44.854	275	24.61	257	10.887	186	30.93	123	41.299	161	47.71	190	59.349	172	49.61	56
26.5	45.076	222	27.20	259	11.041	154	32.03	110	41.421	122	49.90	219	59.492	143	50.00	39
ov. 5.5	45.245	169	29.73	253	11.163	122	33.01	98	41.503	82	52.28	238	59.605	113	50.22	22
15.5	45.359	114	32.19	246	11.253	90	33.86	85	41.547	44	54.76	248	59.687	82	50.31	9
25.4	45.414	55	34.51	232	11.307	54	34.55	69	41.551	4	57.24	248	59.739	52	50.27	4
ec. 5.4	45.409	5	36.62	211	11.327	20	35.11	56	41.517	34	59.63	239	59.758	19	50.12	15
15.4	45.347	62	38.47	185	11.311	16	35.51	40	41.447	70	61.83	220	59.745	13	49.87	25
25.4	45.227	120	40.00	153	11.261	50	35.73	22	41.343	104	63.78	195	59.701	44	49.55	32
35.3	45.054	173	41.16	116	11.178	83	35.78	5	41.210	133	65.39	161	59.627	74	49.14	41
...an Place	37.944		7.10		5.632		9.16		37.016		74.56		54.428		26.31	
...c δ, Tan δ	1.768		+1.458		1.122		+0.508		1.189		−0.643		1.034		+0.263	
...α, D_a α	+0.09		−0.07		+0.07		−0.03		+0.05		+0.03		+0.07		−0.01	
...δ, D_a δ	+0.3		+0.7		+0.3		+0.7		+0.3		+0.7		+0.3		+0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	τ^2 Eridani. Mag. 4.8 Right Ascension.		τ^2 Eridani. Declination.		τ Persei. Mag. 4.1 Right Ascension.		τ Persei. Declination.		η Eridani. Mag. 4.0 Right Ascension.		η Eridani. Declination.		ε Arietis (… Mag. 4… Right Ascension.	
	h m		° ′		h m		° ′		h m		° ′		h m	
	2 47		−21 20		2 48		+52 25		2 52		− 9 13		2 54	
	s		″		s		″		s		″		s	
Jan. 0.3	18.067		44.48		24.234		44.88		24.078		37.56		29.629	
10.3	17.950	117	45.73	125	24.059	175	45.73	85	23.984	94	38.63	107	29.542	87
20.3	17.812	138	46.70	97	23.843	216	46.20	47	23.865	119	39.52	89	29.428	114
30.3	17.656	156	47.33	63	23.598	245	46.23	3	23.729	136	40.19	67	29.292	136
Feb. 9.2	17.489	167	47.62	29	23.334	264	45.83	40	23.581	148	40.65	46	29.142	150
19.2	17.319	170	47.58	4	23.067	267	45.03	80	23.428	153	40.86	21	28.985	157
Mar. 1.2	17.155	164	47.18	40	22.811	256	43.85	118	23.278	150	40.83	3	28.831	154
11.2	17.004	151	46.44	74	22.580	231	42.36	149	23.139	139	40.55	28	28.691	140
21.1	16.875	129	45.38	106	22.388	192	40.60	176	23.022	117	40.03	52	28.574	117
31.1	16.776	99	44.02	136	22.248	140	38.67	193	22.932	90	39.24	79	28.487	87
Apr. 10.1	16.713	63	42.36	166	22.169	79	36.65	202	22.878	54	38.22	102	28.438	49
20.0	16.693	20	40.14	192	22.159	10	34.62	203	22.865	13	36.94	128	28.435	3
30.0	16.718	25	38.29	215	22.221	62	32.66	196	22.895	30	35.45	149	28.480	45
May 10.0	16.790	72	35.95	234	22.357	136	30.86	180	22.970	75	33.74	171	28.575	95
20.0	16.908	118	33.47	248	22.562	205	29.29	157	23.091	121	31.87	187	28.717	142
29.9	17.071	163	30.90	257	22.833	271	27.99	130	23.255	164	29.86	201	28.903	186
June 8.9	17.275	204	28.29	261	23.164	331	27.01	98	23.458	203	27.75	211	29.132	229
18.9	17.514	239	25.74	255	23.543	379	26.38	63	23.694	236	25.61	214	29.395	263
28.9	17.784	270	23.27	247	23.961	418	26.13	25	23.958	264	23.49	212	29.686	291
July 8.8	18.074	290	20.98	229	24.409	448	26.25	12	24.244	286	21.44	205	29.999	313
18.8	18.381	307	18.92	206	24.875	466	26.72	47	24.543	299	19.51	193	30.324	325
28.8	18.694	313	17.15	177	25.348	473	27.56	84	24.848	305	17.78	173	30.655	331
Aug. 7.7	19.007	313	15.72	143	25.819	471	28.72	116	25.152	304	16.28	150	30.984	329
17.7	19.311	304	14.68	104	26.279	460	30.17	145	25.450	298	15.06	122	31.305	321
27.7	19.603	292	14.05	63	26.719	440	31.89	172	25.735	285	14.16	90	31.612	307
Sept. 6.7	19.875	272	13.86	19	27.134	415	33.83	194	26.001	266	13.61	55	31.901	289
16.6	20.123	248	14.11	25	27.517	383	35.96	213	26.246	245	13.41	20	32.167	266
26.6	20.343	220	14.78	67	27.863	346	38.21	225	26.465	219	13.56	15	32.410	243
Oct. 6.6	20.533	190	15.83	105	28.169	306	40.57	236	26.657	192	14.03	47	32.625	215
16.6	20.691	158	17.21	138	28.432	263	42.99	242	26.820	163	14.81	78	32.812	187
26.5	20.815	124	18.88	167	28.649	217	45.41	242	26.954	134	15.84	103	32.968	156
Nov. 5.5	20.906	91	20.74	186	28.817	168	47.80	239	27.057	103	17.07	123	33.094	126
15.5	20.962	56	22.72	198	28.933	116	50.10	230	27.128	71	18.44	137	33.190	96
25.4	20.984	22	24.75	203	28.996	63	52.25	215	27.169	41	19.89	145	33.251	61
Dec. 5.4	20.973	11	26.73	198	29.004	8	54.22	197	27.177	8	21.35	146	33.279	28
15.4	20.930	43	28.60	187	28.956	48	55.94	172	27.155	22	22.77	142	33.274	5
25.4	20.855	75	30.28	168	28.855	101	57.37	143	27.103	52	24.10	133	33.234	40
35.3	20.751	104	31.73	145	28.705	150	58.41	107	27.022	81	25.28	118	33.162	72
Mean Place	16.333		43.61		21.811		25.44		22.329		40.10		27.735	
Sec δ, Tan δ	1.074		−0.391		1.640		+1.300		1.013		−0.162		1.071	
$D_\psi \alpha$, $D_\omega \alpha$	+0.05		+0.02		+0.08		−0.06		+0.06		+0.01		+0.07	
$D_\psi \delta$, $D_\omega \delta$	+0.3		+0.7		+0.3		+0.7		+0.3		+0.7		+0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

…ngton …n Time.	47 H. Cephei. Mag. 5.7				θ Eridani. Mag. 3.4				α Ceti. Mag. 2.8				τ³ Eridani. Mag. 4.2			
	Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.	
	h m 2 54		° ′ +79 5		h m 2 55		° ′ −40 37		h m 2 57		° ′ + 3 45		h m 2 58		° ′ −23 56	
	s		″		s		″		s		″		s		″	
ı. 0.3	65.57		55.41		8.843		77.75		58.131		59.57		45.736		58.21	
10.3	64.81	76	57.21	180	8.666	177	79.27	152	58.048	83	58.82	75	45.618	118	59.60	139
20.3	63.92	89	58.45	124	8.462	204	80.33	106	57.940	108	58.14	68	45.477	141	60.65	105
30.3	62.94	98	59.11	66	8.240	222	80.91	58	57.812	128	57.52	62	45.315	162	61.36	71
b. 9.2	61.92	102	59.15	4	8.006	234	81.01	10	57.670	142	56.99	53	45.141	174	61.71	35
19.2	60.90	102	58.60	55	7.771	235	80.63	38	57.522	148	56.56	43	44.962	179	61.69	2
r. 1.2	59.92	98	57.47	113	7.541	230	79.77	86	57.376	146	56.25	31	44.787	175	61.30	39
11.2	59.04	88	55.81	166	7.328	213	78.46	131	57.240	136	56.09	16	44.624	163	60.54	76
21.1	58.28	76	53.70	211	7.140	188	76.74	172	57.126	114	56.07	2	44.481	143	59.44	110
31.1	57.70	58	51.23	247	6.987	153	74.64	210	57.040	86	56.23	16	44.368	113	58.02	142
r. 10.1	57.30	40	48.51	272	6.876	111	72.22	242	56.987	53	56.57	34	44.290	78	56.29	173
20.0	57.11	19	45.64	287	6.813	63	69.50	272	56.976	11	57.11	54	44.254	36	54.29	200
30.0	57.14	3	42.72	292	6.803	10	66.56	294	57.010	34	57.87	76	44.264	10	52.06	223
y 10.0	57.40	26	39.87	285	6.848	45	63.45	311	57.089	79	58.81	94	44.321	57	49.63	243
20.0	57.86	46	37.20	267	6.947	99	60.25	320	57.213	124	59.97	116	44.426	105	47.05	258
29.9	58.53	67	34.77	243	7.099	152	57.03	322	57.380	167	61.30	133	44.576	150	44.40	265
ne 8.9	59.37	84	32.66	211	7.301	202	53.86	317	57.586	206	62.77	147	44.769	193	41.71	269
18.9	60.36	99	30.94	172	7.548	247	50.83	303	57.825	239	64.37	160	44.999	230	39.07	264
28.9	61.48	112	29.66	128	7.832	284	47.99	284	58.093	268	66.05	168	45.261	262	36.54	253
ly 8.8	62.71	123	28.84	82	8.147	315	45.45	254	58.381	288	67.75	170	45.547	286	34.17	237
18.8	64.01	130	28.51	33	8.484	337	43.27	218	58.683	302	69.43	168	45.851	304	32.05	212
28.8	65.34	133	28.66	15	8.835	351	41.50	177	58.990	307	71.04	161	46.164	313	30.23	182
g. 7.7	66.69	135	29.30	64	9.191	356	40.21	129	59.297	307	72.54	150	46.480	316	28.78	145
17.7	68.02	133	30.40	110	9.540	349	39.42	79	59.596	299	73.88	134	46.790	310	27.73	105
27.7	69.31	129	31.95	155	9.878	338	39.18	24	59.884	288	75.02	114	47.087	297	27.11	62
pt. 6.7	70.53	122	33.90	195	10.194	316	39.49	31	60.155	271	75.93	91	47.368	281	26.95	16
16.6	71.67	114	36.22	232	10.484	290	40.34	85	60.405	250	76.59	66	47.625	257	27.25	30
26.6	72.71	104	38.88	266	10.740	256	41.70	136	60.632	227	77.00	41	47.857	232	27.99	74
t. 6.6	73.63	92	41.80	292	10.958	218	43.52	182	60.832	200	77.16	16	48.058	201	29.13	114
16.6	74.40	77	44.95	315	11.136	178	45.72	220	61.005	173	77.08	8	48.227	169	30.64	151
26.5	75.00	60	48.25	330	11.270	134	48.23	251	61.151	146	76.78	30	48.363	136	32.43	179
ov. 5.5	75.44	44	51.63	338	11.360	90	50.93	270	61.267	116	76.31	47	48.464	101	34.43	200
15.5	75.69	25	55.00	337	11.403	43	53.73	280	61.354	87	75.69	62	48.529	65	36.58	215
25.4	75.75	6	58.30	330	11.403	0	56.53	280	61.409	55	74.96	73	48.559	30	38.77	219
ec. 5.4	75.62	13	61.43	313	11.358	45	59.21	268	61.433	24	74.17	79	48.554	5	40.91	214
15.4	75.29	33	64.30	287	11.271	87	61.67	246	61.427	6	73.35	82	48.515	39	42.94	203
25.4	74.78	51	66.81	251	11.146	125	63.82	215	61.388	39	72.53	82	48.442	73	44.78	184
35.3	74.10	68	68.89	208	10.985	161	65.62	180	61.319	69	71.73	80	48.340	102	46.35	157
…n Place	59.610		32.52		6.964		72.34		56.323		53.30		43.945		56.75	
…e δ, Tan δ	5.285		+5.190		1.317		−0.858		1.002		+0.066		1.094		−0.444	
…, D_ψ α	+0.16		−0.25		+0.05		+0.04		+0.06		0.00		+0.05		+0.02	
D_ψ δ	+0.3		+0.7		+0.3		+0.7		+0.3		+0.7		+0.3		+0.7	

FOR THE UPPER TRANSIT AT .

FOR THE UPPER TRANSIT AT WASHINGTON.

ngton Time.	β Persei. (*Algol.*) Var. 2.1–3.2				δ Arietis. Mag. 4.5				12 Eridani. Mag. 4.0				48 H. Cephei. Mag. 5.5			
	Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.	
	h m 3 2		° ′ +40 38		h m 3 6		° ′ +19 24		h m 3 8		° ′ −29 18		h m 3 9		° ′ +77 25	
	s		″		s		″		s		″		s		″	
0.4	47.956	115	28.58	55	54.742	79	59.73	24	34.512	127	52.12	151	50.12	60	75.23	189
10.3	47.841	150	29.13	24	54.663	109	59.49	32	34.385	153	53.63	116	49.52	73	77.12	138
20.3	47.691	178	29.37	6	54.554	132	59.17	41	34.232	175	54.79	76	48.79	82	78.50	81
30.3	47.513	198	29.31	37	54.422	148	58.76	50	34.057	189	55.55	35	47.97	87	79.31	22
9.2	47.315	205	28.94	67	54.274	157	58.26	56	33.868	195	55.90	6	47.10	89	79.53	38
19.2	47.110	202	28.27	93	54.117	157	57.70	61	33.673	194	55.84	46	46.21	86	79.15	96
1.2	46.908	187	27.34	117	53.960	146	57.09	63	33.479	182	55.38	86	45.35	78	78.19	149
11.2	46.721	158	26.17	133	53.814	125	56.46	61	33.297	161	54.52	125	44.57	69	76.70	195
21.1	46.563	119	24.84	144	53.689	96	55.85	56	33.136	132	53.27	160	43.88	56	74.75	233
31.1	46.444	72	23.40	149	53.593	57	55.29	48	33.004	97	51.67	192	43.32	38	72.42	262
10.1	46.372	17	21.91	147	53.536	15	54.81	34	32.907	54	49.75	222	42.94	22	69.80	278
20.1	46.355	42	20.44	137	53.521	32	54.47	18	32.853	7	47.53	245	42.72	3	67.02	286
30.0	46.397	100	19.07	122	53.553	81	54.29	0	32.846	42	45.08	266	42.69	18	64.16	283
10.0	46.497	160	17.85	102	53.634	129	54.29	21	32.888	92	42.42	280	42.87	35	61.33	268
20.0	46.657	215	16.83	77	53.763	175	54.50	40	32.980	139	39.62	287	43.22	54	58.65	248
29.9	46.872	264	16.06	50	53.938	216	54.90	63	33.119	185	36.75	289	43.76	69	56.17	218
8.9	47.136	307	15.56	20	54.154	253	55.53	82	33.304	225	33.86	284	44.45	84	53.99	183
18.9	47.443	342	15.36	10	54.407	281	56.35	99	33.529	260	31.02	270	45.29	96	52.16	141
28.9	47.785	368	15.46	38	54.688	305	57.34	115	33.789	286	28.32	249	46.25	106	50.75	98
8.8	48.153	385	15.84	67	54.993	318	58.49	126	34.075	307	25.83	222	47.31	112	49.77	50
18.8	48.538	393	16.51	92	55.311	326	59.75	133	34.382	318	23.61	190	48.43	117	49.27	4
28.8	48.931	393	17.43	115	55.637	326	61.08	136	34.700	324	21.71	149	49.60	119	49.23	44
g. 7.8	49.324	387	18.58	135	55.963	320	62.44	136	35.024	320	20.22	105	50.79	119	49.67	89
17.7	49.711	372	19.93	151	56.283	308	63.80	132	35.344	310	19.17	58	51.98	116	50.56	134
27.7	50.083	352	21.44	164	56.591	293	65.12	124	35.654	294	18.59	8	53.14	111	51.90	175
pt. 6.7	50.435	329	23.08	173	56.884	273	66.36	113	35.948	273	18.51	41	54.25	105	53.65	213
16.6	50.764	300	24.81	179	57.157	248	67.49	102	36.221	245	18.92	89	55.30	95	55.78	245
26.6	51.064	269	26.60	181	57.405	225	68.51	87	36.466	215	19.81	132	56.25	86	58.23	275
t. 6.6	51.333	237	28.41	181	57.630	197	69.38	73	36.681	183	21.13	171	57.11	74	60.98	298
16.6	51.570	201	30.22	178	57.827	168	70.11	59	36.864	147	22.84	203	57.85	61	63.96	315
26.5	51.771	163	32.00	172	57.995	139	70.70	46	37.011	110	24.87	225	58.46	45	67.11	326
v. 5.5	51.934	123	33.72	162	58.134	107	71.16	33	37.121	73	27.12	239	58.91	31	70.37	329
15.5	52.057	81	35.34	150	58.241	74	71.49	21	37.194	34	29.51	243	59.22	14	73.66	324
25.5	52.138	37	36.84	136	58.315	42	71.70	10	37.228	3	31.94	239	59.36	4	76.90	310
c. 5.4	52.175	7	38.20	116	58.357	6	71.80	1	37.225	41	34.33	225	59.32	21	80.00	288
15.4	52.168	51	39.36	95	58.363	29	71.81	10	37.184	77	36.58	202	59.11	38	82.88	256
25.4	52.117	93	40.31	68	58.334	63	71.71	19	37.107	110	38.60	173	58.73	52	85.44	216
35.3	52.024		40.99		58.271		71.52		36.997		40.33		58.21		87.60	
n Place	45.724		12.42		52.788		49.19		32.655		49.45		44.362		53.42	
δ, Tan δ	1.318		+0.858		1.060		+0.352		1.147		−0.561		4.596		+4.486	
ι, D$_\psi$ α	+0.06		−0.04		+0.07		−0.02		+0.05		+0.03		+0.15		−0.20	
δ, D$_\psi$ δ	*+0.3*		*+0.7*		+0.3		+0.7		+0.3		+0.7		+0.3		+0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time	ζ Arietis. Mag. 5.0 Right Ascension.		Declination.	
	h m 3 10		° ′ +20 44	
	s		″	
Jan. 0.4	9.614	79	26.05	18
10.3	9.535	108	25.87	29
20.3	9.427	132	25.58	39
30.3	9.295	150	25.19	47
Feb. 9.2	9.145	159	24.72	56
19.2	8.986	159	24.16	62
Mar. 1.2	8.827	149	23.54	65
11.2	8.678	128	22.89	66
21.1	8.550	100	22.23	61
31.1	8.450	61	21.62	53
Apr. 10.1	8.389	18	21.09	41
20.1	8.371	-28	20.68	26
30.0	8.399	78	20.42	9
May 10.0	8.477	127	20.33	-10
20.0	8.604	172	20.43	33
29.9	8.776	215	20.76	52
June 8.9	8.991	252	21.28	74
18.9	9.243	281	22.02	91
28.9	9.524	305	22.93	107
July 8.8	9.829	319	24.00	120
18.8	10.148	328	25.20	128
28.8	10.476	329	26.48	133
Aug. 7.8	10.805	323	27.81	134
17.7	11.128	313	29.15	131
27.7	11.441	295	30.46	125
Sept. 6.7	11.736	276	31.71	115
16.6	12.012	254	32.86	104
26.6	12.266	229	33.90	92
Oct. 6.6	12.495	201	34.82	79
16.6	12.696	172	35.61	65
26.5	12.868	143	36.26	52
Nov. 5.5	13.011	111	36.78	40
15.5	13.122	78	37.18	28
25.5	13.200	45	37.46	17
Dec. 5.4	13.245	8	37.63	7
15.4	13.253	-27	37.70	3
25.4	13.226	61	37.67	13
35.3	13.165		37.54	
Mean Place	7.630		15.26	
Sec δ, Tan δ	1.069		+0.379	
$D_\psi \alpha$, $D_\omega \alpha$	+0.07		−0.02	
$D_\psi \delta$, $D_\omega \delta$	+0.3		+0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

gton Time.	*ε* Eridani. Mag. 4.3 Right Ascension.		*ε* Eridani. Declination.		*ι* Hydri. Mag. 5.5 Right Ascension.		*ι* Hydri. Declination.		*α* Persei. Mag. 1.9 Right Ascension.		*α* Persei. Declination.		*ο* Tauri. Mag. 3.8 Right Ascension.		*ο* Tauri. Declination.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	3 16		−43 22		3 17		−77 40		3 18		+49 34		3 20		+ 8 44	
	s		″		s		″		s		″		s		″	
0.4	38.765	173	77.02	174	64.19	93	100.85	159	25.954	132	17.71	99	22.605	70	22.58	61
10.3	38.592	204	78.76	129	63.26	102	102.44	103	25.822	178	18.70	63	22.535	99	21.97	59
20.3	38.388	227	80.05	79	62.24	108	103.47	41	25.644	215	19.33	26	22.436	124	21.38	56
30.3	38.161	244	80.84	30	61.16	110	103.88	— 15	25.429	239	19.59	— 12	22.312	142	20.82	52
9.3	37.917	253	81.14	— 22	60.06	111	103.73	74	25.190	253	19.47	50	22.170	152	20.30	47
19.2	37.664	249	80.92	70	58.95	107	102.99	130	24.937	252	18.97	86	22.018	155	19.83	40
1.2	37.415	235	80.22	120	57.88	101	101.69	180	24.685	236	18.11	119	21.863	147	19.43	32
11.2	37.180	212	79.02	162	56.87	93	99.89	224	24.449	206	16.92	145	21.716	128	19.11	20
21.1	36.968	180	77.40	203	55.94	82	97.65	268	24.243	163	15.47	166	21.588	104	18.91	8
31.1	36.788	137	75.37	238	55.12	70	94.97	299	24.080	109	13.81	179	21.484	69	18.83	— 6
10.1	36.651	90	72.99	271	54.42	55	91.98	326	23.971	47	12.02	183	21.415	30	18.89	24
20.1	36.561	39	70.28	294	53.87	39	88.72	343	23.924	— 19	10.19	182	21.385	— 15	19.13	42
30.0	36.522	— 18	67.34	314	53.48	23	85.29	358	23.943	88	8.37	170	21.400	61	19.55	60
10.0	36.540	76	64.20	326	53.25	6	81.71	363	24.031	156	6.67	155	21.461	107	20.15	80
20.0	36.616	132	60.94	330	53.19	— 12	78.08	356	24.187	221	5.12	134	21.568	151	20.95	98
30.0	36.748	185	57.64	327	53.31	28	74.52	343	24.408	281	3.78	106	21.719	191	21.93	115
8.9	36.933	235	54.37	317	53.59	45	71.09	320	24.689	332	2.72	76	21.910	229	23.08	128
18.9	37.168	277	51.20	296	54.04	60	67.89	293	25.021	374	1.96	45	22.139	258	24.36	139
28.9	37.445	313	48.24	271	54.64	73	64.96	254	25.395	408	1.51	11	22.397	281	25.75	146
8.8	37.758	341	45.53	235	55.37	84	62.42	210	25.803	431	1.40	— 22	22.678	297	27.21	148
18.8	38.099	359	43.18	193	56.21	93	60.32	158	26.234	446	1.62	52	22.975	308	28.69	147
28.8	38.458	369	41.25	145	57.14	98	58.74	102	26.680	450	2.14	83	23.283	310	30.16	140
. 7.8	38.827	369	39.80	93	58.12	101	57.72	42	27.130	445	2.97	111	23.593	305	31.56	129
17.7	39.196	362	38.87	39	59.13	101	57.30	— 16	27.575	434	4.08	135	23.898	297	32.85	114
27.7	39.558	344	38.48	— 19	60.14	96	57.46	81	28.009	416	5.43	157	24.195	284	33.99	96
t. 6.7	39.902	322	38.67	75	61.10	90	58.27	143	28.425	392	7.00	174	24.479	265	34.95	76
16.7	40.224	290	39.42	129	62.00	80	59.70	193	28.817	362	8.74	188	24.744	246	35.71	55
26.6	40.514	256	40.71	179	62.80	67	61.63	246	29.179	330	10.62	199	24.990	222	36.26	32
. 6.6	40.770	214	42.50	220	63.47	52	64.09	284	29.509	292	12.61	207	25.212	197	36.58	13
16.6	40.984	169	44.70	255	63.99	34	66.93	315	29.801	252	14.68	212	25.409	170	36.71	— 7
26.5	41.153	124	47.25	278	64.33	17	70.08	333	30.053	208	16.80	210	25.579	143	36.64	24
v. 5.5	41.277	75	50.03	293	64.50	— 4	73.41	339	30.261	161	18.90	207	25.722	112	36.40	37
15.5	41.352	27	52.96	295	64.46	22	76.80	333	30.422	110	20.97	199	25.834	80	36.03	49
25.5	41.379	— 21	55.91	287	64.24	40	80.13	312	30.532	58	22.96	186	25.914	49	35.54	56
:. 5.4	41.358	68	58.78	265	63.84	58	83.25	283	30.590	1	24.82	167	25.963	14	34.98	60
15.4	41.290	112	61.43	239	63.26	73	86.08	243	30.591	— 52	26.49	144	25.977	— 20	34.38	63
25.4	41.178	151	63.82	201	62.53	86	88.51	195	30.539	106	27.93	116	25.957	52	33.75	63
35.4	41.027		65.83		61.67		90.46		30.433		29.09		25.905		33.12	
. Place	36.756		71.60		60.035		91.67		23.335		0.45		20.663		15.33	
, Tan *δ*	1.376		−0.945		4.690		−4.582		1.542		+1.174		1.012		+0.154	
, $D_{\psi}\,\alpha$	+0.04		+0.04		−0.03		+0.20		+0.08		−0.05		+0.06		−0.01	
, $D_{\psi}\,\delta$	+0.3		+0.8		+0.3		+0.8		+0.3		+0.8		+0.3		+0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	2 H. Camelop. Mag. 4.4				ξ Tauri. Mag. 3.8				f Tauri. Mag. 4.3				ε Eridani Mag. 3.	
	Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.	
	h m 3 22		° ′ +59 39		h m 3 22		° ′ + 9 26		h m 3 26		° ′ +12 39		h m 3 29	
	s		″		s		″		s		″		s	
Jan. 0.4	23.405	190	26.93	140	42.084	68	45.68	59	19.302	66	19.25	46	3.035	80
10.3	23.215	248	28.33	99	42.016	97	45.09	57	19.236	96	18.79	48	2.955	111
20.3	22.967	295	29.32	55	41.919	123	44.52	54	19.140	124	18.31	48	2.844	135
30.3	22.672	326	29.87	8	41.796	142	43.98	51	19.016	143	17.83	49	2.709	152
Feb. 9.3	22.346	342	29.95	40	41.654	152	43.47	47	18.873	154	17.34	48	2.557	164
19.2	22.004	340	29.55	84	41.502	155	43.00	41	18.719	157	16.86	45	2.393	165
Mar. 1.2	21.664	320	28.71	126	41.347	147	42.59	33	18.562	151	16.41	40	2.228	158
11.2	21.344	281	27.45	162	41.200	131	42.26	22	18.411	134	16.01	34	2.070	143
21.1	21.063	227	25.83	189	41.069	105	42.04	11	18.277	107	15.67	24	1.927	117
31.1	20.836	160	23.94	211	40.964	70	41.93	3	18.170	74	15.43	12	1.810	85
Apr. 10.1	20.676	81	21.83	222	40.894	32	41.96	20	18.096	33	15.31	1	1.725	48
20.1	20.595	4	19.61	225	40.862	13	42.16	37	18.063	11	15.32	19	1.677	4
30.0	20.599	90	17.36	219	40.875	58	42.53	55	18.074	57	15.51	36	1.673	41
May 10.0	20.689	175	15.17	204	40.933	106	43.08	76	18.131	105	15.87	55	1.714	87
20.0	20.864	257	13.13	185	41.039	150	43.84	93	18.236	149	16.42	74	1.801	131
30.0	21.121	332	11.28	157	41.189	190	44.77	108	18.385	191	17.16	91	1.932	173
June 8.9	21.453	398	9.71	125	41.379	228	45.85	126	18.576	228	18.07	106	2.105	209
18.9	21.851	454	8.46	92	41.607	258	47.11	134	18.804	259	19.13	120	2.314	240
28.9	22.305	497	7.54	53	41.865	281	48.45	143	19.063	283	20.33	129	2.554	266
July 8.8	22.802	529	7.01	16	42.146	297	49.88	145	19.346	301	21.62	135	2.820	284
18.8	23.331	549	6.85	22	42.443	308	51.33	144	19.647	310	22.97	136	3.104	294
28.8	23.880	558	7.07	59	42.751	310	52.77	139	19.957	314	24.33	133	3.398	300
Aug. 7.8	24.438	555	7.66	94	43.061	308	54.16	129	20.271	311	25.66	126	3.698	299
17.7	24.993	542	8.60	127	43.369	298	55.45	113	20.582	302	26.92	115	3.997	290
27.7	25.535	522	9.87	157	43.667	286	56.58	97	20.884	290	28.07	102	4.287	278
Sept. 6.7	26.057	494	11.44	183	43.953	269	57.55	77	21.174	274	29.09	85	4.565	260
16.7	26.551	458	13.27	207	44.222	246	58.32	57	21.448	253	29.94	68	4.825	240
26.6	27.009	417	15.34	225	44.468	225	58.89	37	21.701	231	30.62	48	5.065	216
Oct. 6.6	27.426	371	17.59	239	44.693	199	59.26	14	21.932	205	31.10	30	5.281	191
16.6	27.797	318	19.98	250	44.892	173	59.40	4	22.137	181	31.40	14	5.472	163
26.5	28.115	260	22.48	255	45.065	145	59.36	20	22.318	151	31.54	2	5.635	134
Nov. 5.5	28.375	198	25.03	256	45.210	115	59.16	34	22.469	121	31.52	15	5.769	101
15.5	28.573	129	27.59	249	45.325	83	58.82	45	22.590	91	31.37	26	5.870	70
25.5	28.702	61	30.08	238	45.408	52	58.37	52	22.681	56	31.11	33	5.940	36
Dec. 5.4	28.763	12	32.46	218	45.460	16	57.85	57	22.737	22	30.78	40	5.976	3
15.4	28.751	85	34.64	194	45.476	17	57.28	59	22.759	14	30.38	44	5.979	32
25.4	28.666	154	36.58	161	45.459	51	56.69	61	22.745	48	29.94	46	5.947	66
35.4	28.512		38.19		45.408		56.08		22.697		29.48		5.881	
Mean Place	20.239		8.13		40.128		38.30		17.304		11.11		1.141	
Sec δ, Tan δ	1.979		+1.708		1.014		+0.166		1.025		+0.224		1.015	
$D_\psi a$, $D_\omega a$	+0.10		−0.07		+0.06		−0.01		+0.06		−0.01		+0.06	
$D_\psi \delta$, $D_\omega \delta$	+0.3		+0.8		+0.3		+0.8		+0.2		+0.8		+0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

...ington ...n Time.	τ^5 Eridani. Mag. 4.3 Right Ascension.		Declination.		δ Persei. Mag. 3.1 Right Ascension.		Declination.		δ Eridani. Mag. 3.7 Right Ascension.		Declination.		ν Persei. Mag. 3.9 Right Ascension.		Declination.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	3 30		−21 54		3 37		+47 31		3 39		−10 2		3 39		+42 19	
	s		″		s		″		s		″		s		″	
... 0.4	9.119	96	39.15	157	3.208	106	39.42	102	18.243	72	35.44	128	35.532	88	17.52	81
10.3	9.023	127	40.72	126	3.102	153	40.44	71	18.171	102	36.72	107	35.444	132	18.33	55
20.3	8.896	152	41.98	94	2.949	193	41.15	38	18.069	130	37.79	85	35.312	170	18.88	26
30.3	8.744	171	42.92	59	2.756	224	41.53	3	17.939	150	38.64	60	35.142	198	19.14	4
b. 9.3	8.573	181	43.51	23	2.532	240	41.56	33	17.789	163	39.24	37	34.944	216	19.10	35
19.2	8.392	183	43.74	13	2.292	246	41.23	68	17.626	167	39.61	11	34.728	221	18.75	64
r. 1.2	8.209	177	43.61	47	2.046	235	40.55	99	17.459	162	39.72	17	34.507	211	18.11	90
11.2	8.032	160	43.14	84	1.811	210	39.56	126	17.297	149	39.55	42	34.296	192	17.21	113
21.2	7.872	136	42.30	117	1.601	174	38.30	147	17.148	125	39.13	69	34.104	157	16.08	129
31.1	7.736	102	41.13	145	1.427	125	36.83	162	17.023	96	38.44	93	33.947	114	14.79	141
r. 10.1	7.634	61	39.68	177	1.302	67	35.21	169	16.927	58	37.51	119	33.833	62	13.38	146
20.1	7.570	20	37.91	203	1.235	4	33.52	170	16.869	16	36.32	142	33.771	3	11.92	143
30.0	7.550	26	35.88	223	1.231	61	31.82	162	16.853	29	34.90	164	33.768	56	10.49	136
ay 10.0	7.576	74	33.65	240	1.292	127	30.20	149	16.882	75	33.26	182	33.824	118	9.13	122
20.0	7.650	120	31.25	252	1.419	192	28.71	132	16.957	119	31.44	196	33.942	176	7.91	104
30.0	7.770	164	28.73	260	1.611	249	27.39	107	17.076	161	29.48	207	34.118	230	6.87	81
ne 8.9	7.934	204	26.13	257	1.860	302	26.32	81	17.237	200	27.41	214	34.348	279	6.06	57
18.9	8.138	237	23.56	252	2.162	347	25.51	52	17.437	232	25.27	214	34.627	320	5.49	29
28.9	8.375	266	21.04	239	2.509	381	24.99	23	17.669	259	23.13	207	34.947	353	5.20	4
ly 8.9	8.641	287	18.65	217	2.890	408	24.76	7	17.928	278	21.06	197	35.300	377	5.16	24
18.8	8.928	302	16.48	192	3.298	425	24.83	37	18.206	292	19.09	179	35.677	392	5.40	48
28.8	9.230	308	14.56	158	3.723	433	25.20	65	18.498	298	17.30	156	36.069	402	5.88	72
ug. 7.8	9.538	308	12.98	120	4.156	433	25.85	89	18.796	300	15.74	128	36.471	399	6.60	93
17.7	9.846	301	11.78	78	4.589	426	26.74	113	19.096	294	14.46	96	36.870	394	7.53	112
27.7	10.147	290	11.00	34	5.015	412	27.87	132	19.390	283	13.50	61	37.264	381	8.65	127
pt. 6.7	10.437	273	10.66	12	5.427	392	29.19	150	19.673	269	12.89	23	37.645	363	9.92	139
16.7	10.710	251	10.78	57	5.819	368	30.69	164	19.942	249	12.66	13	38.008	341	11.31	149
26.6	10.961	226	11.35	100	6.187	338	32.33	175	20.191	228	12.79	49	38.349	314	12.80	156
ct. 6.6	11.187	197	12.35	137	6.525	306	34.08	184	20.419	203	13.28	82	38.663	286	14.36	160
16.6	11.384	167	13.72	170	6.831	269	35.92	188	20.622	176	14.10	111	38.949	251	15.96	163
26.6	11.551	135	15.42	195	7.100	229	37.80	190	20.798	148	15.21	133	39.200	216	17.59	162
ov. 5.5	11.686	101	17.37	213	7.329	184	39.70	189	20.946	117	16.54	150	39.416	175	19.21	160
15.5	11.787	65	19.50	221	7.513	136	41.59	184	21.063	84	18.04	162	39.591	133	20.81	153
25.5	11.852	28	21.71	220	7.649	85	43.43	174	21.147	52	19.66	166	39.724	86	22.34	144
ec. 5.4	11.880	9	23.91	212	7.734	32	45.17	159	21.199	15	21.32	161	39.810	37	23.78	132
15.4	11.871	43	26.03	197	7.766	24	46.76	141	21.214	20	22.93	153	39.847	12	25.10	114
25.4	11.828	79	28.00	174	7.742	78	48.17	117	21.194	53	24.46	140	39.835	63	26.24	94
35.4	11.749		29.74		7.664		49.34		21.141		25.86		39.772		27.18	
...n Place	7.202		38.44		0.504		23.67		16.294		37.56		32.977		2.94	
...δ, Tan δ	1.078		−0.402		1.481		+1.092		1.016		−0.177		1.353		+0.910	
$D_\omega \alpha$	+0.05		+0.02		+0.08		−0.04		+0.06		+0.01		+0.08		−0.04	
$D_\omega \delta$	+0.2		+0.8		+0.2		+0.8		+0.2		+0.8		+0.2		+0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

ington Time.	γ Hydri. Mag. 3.2 Right Ascension.		Declination.		ζ Persei. Mag. 2.9 Right Ascension.		Declination.		9 H. Camelop. Mag. 5.2 Right Ascension.		Declination.		ε Persei. Mag. 3.0 Right Ascension.		Declination.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	3 48		−74 29		3 48		+31 38		3 50		+60 51		3 52		+39 46	
	s		″		s		″		s		″		s		″	
0.4	34.33	67	44.67	205	56.997	61	29.05	38	6.52	17	78.17	165	19.355	70	29.53	75
10.4	33.66	75	46.72	153	56.936	102	29.43	21	6.35	23	79.82	128	19.285	116	30.28	54
20.3	32.91	82	48.25	96	56.834	135	29.64	3	6.12	28	81.10	87	19.169	154	30.82	27
30.3	32.09	87	49.21	38	56.699	163	29.67	16	5.84	33	81.97	41	19.015	184	31.09	2
9.3	31.22	88	49.59	20	56.536	180	29.51	34	5.51	36	82.38	6	18.831	204	31.11	26
19.2	30.34	88	49.39	76	56.356	188	29.17	53	5.15	36	82.32	52	18.627	214	30.85	52
1.2	29.46	86	48.63	130	56.168	184	28.64	70	4.79	36	81.80	96	18.413	207	30.33	78
11.2	28.60	79	47.33	180	55.984	167	27.94	81	4.43	32	80.84	136	18.206	191	29.55	97
21.2	27.81	73	45.53	225	55.817	141	27.13	90	4.11	27	79.48	170	18.015	160	28.58	115
31.1	27.08	63	43.28	263	55.676	103	26.23	94	3.84	21	77.78	196	17.855	120	27.43	125
r. 10.1	26.45	53	40.65	297	55.573	59	25.29	94	3.63	13	75.82	215	17.735	72	26.18	131
20.1	25.92	40	37.68	323	55.514	10	24.35	88	3.50	5	73.67	223	17.663	17	24.87	129
30.1	25.52	28	34.45	342	55.504	43	23.47	78	3.45	3	71.44	224	17.646	40	23.58	123
y 10.0	25.24	13	31.03	354	55.547	98	22.69	63	3.48	13	69.20	216	17.686	101	22.35	110
20.0	25.11	0	27.49	356	55.645	149	22.06	47	3.61	21	67.04	203	17.787	157	21.25	94
30.0	25.11	14	23.93	350	55.794	197	21.59	26	3.82	31	65.01	181	17.944	210	20.31	74
ne 8.9	25.25	29	20.43	337	55.991	241	21.33	6	4.13	37	63.20	154	18.154	258	19.57	53
18.9	25.54	41	17.06	313	56.232	277	21.27	15	4.50	43	61.66	124	18.412	299	19.04	27
28.9	25.95	52	13.93	283	56.509	308	21.42	35	4.93	48	60.42	91	18.711	332	18.77	4
ly 8.9	26.47	63	11.10	243	56.817	329	21.77	54	5.41	53	59.51	54	19.043	359	18.73	20
18.8	27.10	70	8.67	196	57.146	345	22.31	72	5.94	55	58.97	18	19.402	376	18.93	42
28.8	27.80	77	6.71	143	57.491	354	23.03	84	6.49	57	58.79	18	19.778	385	19.35	65
ıg. 7.8	28.57	81	5.28	86	57.845	354	23.87	96	7.06	58	58.97	53	20.163	387	20.00	82
17.8	29.38	82	4.42	24	58.199	348	24.83	105	7.64	57	59.50	88	20.550	383	20.82	98
27.7	30.20	81	4.18	39	58.547	340	25.88	110	8.21	56	60.38	119	20.933	373	21.80	111
pt. 6.7	31.01	78	4.57	101	58.887	324	26.98	112	8.77	54	61.57	147	21.306	357	22.91	122
16.7	31.79	71	5.58	160	59.211	305	28.10	113	9.31	51	63.04	174	21.663	339	24.13	130
26.6	32.50	63	7.18	216	59.516	285	29.23	111	9.82	48	64.78	196	22.002	315	25.43	136
ct. 6.6	33.13	52	9.34	264	59.801	259	30.34	108	10.30	43	66.74	217	22.317	289	26.79	140
16.6	33.65	38	11.98	301	60.060	232	31.42	104	10.73	38	68.91	232	22.606	258	28.19	141
26.6	34.03	25	14.99	327	60.292	201	32.46	99	11.11	31	71.23	242	22.864	224	29.60	141
ov. 5.5	34.28	11	18.26	343	60.493	168	33.45	93	11.42	26	73.65	248	23.088	188	31.01	139
15.5	34.39	6	21.69	345	60.661	131	34.38	87	11.68	19	76.13	248	23.276	146	32.40	135
25.5	34.33	19	25.14	335	60.792	93	35.25	79	11.87	12	78.61	243	23.422	102	33.75	127
ec. 5.5	34.14	34	28.49	312	60.885	49	36.04	69	11.99	4	81.04	231	23.524	54	35.02	117
15.4	33.80	49	31.61	280	60.934	5	36.73	58	12.03	4	83.35	210	23.578	5	36.19	104
25.4	33.31	60	34.41	237	60.939	38	37.31	46	11.99	11	85.45	184	23.583	45	37.23	87
35.4	32.71		36.78		60.901		37.77		11.88		87.29		23.538		38.10	
n Place	30.514		36.94		54.636		17.23		2.934		61.14		16.786		16.22	
δ, Tan δ	3.740		−3.604		1.175		+0.616		2.054		+1.794		1.301		+0.832	
α, Dψ α	−0.02		+0.13		+0.07		−0.02		+0.10		−0.06		+0.08		−0.03	
δ, Dψ δ	+0.2		+0.8		+0.2		+0.8		+0.2		+0.8		+0.2		+0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ξ Persei. Mag. 4.0 Right Ascension.		ξ Persei. Declination.		γ Eridani. Mag. 3.2 Right Ascension.		γ Eridani. Declination.		λ Tauri. Var. 3.3–4.2 Right Ascension.		λ Tauri. Declination.		δ Retic Mag. 4. Right Ascension.	
	h m 3 53		° ′ +35 33		h m 3 54		° ′ −13 44		h m 3 56		° ′ +12 15		h m 3 57	
	s		″		s		″		s		″		s	
Jan. 0.4	37.001	62	24.04	58	11.392	68	36.70	149	6.934	46	31.31	48	28.25	31
10.4	36.939	105	21.62	38	11.324	100	38.19	126	6.888	82	30.83	48	27.94	36
20.3	36.834	141	25.00	16	11.224	130	39.45	101	6.806	113	30.35	47	27.58	41
30.3	36.693	172	25.16	5	11.094	153	40.46	73	6.693	138	29.88	44	27.17	45
Feb. 9.3	36.521	190	25.11	29	10.941	169	41.19	44	6.555	155	29.44	43	26.72	46
19.3	36.331	199	24.82	50	10.772	175	41.63	14	6.400	163	29.01	39	26.26	47
Mar. 1.2	36.132	196	24.32	72	10.597	173	41.77	15	6.237	162	28.62	35	25.79	45
11.2	35.936	179	23.60	87	10.424	160	41.62	44	6.075	149	28.27	29	25.34	43
21.2	35.757	151	22.73	101	10.264	140	41.18	74	5.926	127	27.98	19	24.91	38
31.1	35.606	113	21.72	108	10.124	110	40.44	101	5.799	98	27.79	10	24.53	34
Apr. 10.1	35.493	68	20.64	111	10.014	74	39.43	128	5.701	59	27.69	2	24.19	27
20.1	35.425	16	19.53	108	9.940	33	38.15	154	5.642	17	27.71	17	23.92	21
30.1	35.409	39	18.45	100	9.907	12	36.61	175	5.625	29	27.88	33	23.71	13
May 10.0	35.448	96	17.45	87	9.919	57	34.86	193	5.654	76	28.21	49	23.58	5
20.0	35.544	149	16.58	70	9.976	103	32.93	210	5.730	122	28.70	67	23.53	4
30.0	35.693	199	15.88	52	10.079	146	30.83	220	5.852	164	29.37	82	23.57	12
June 8.9	35.892	246	15.36	29	10.225	184	28.63	224	6.016	204	30.19	96	23.69	20
18.9	36.138	284	15.07	9	10.409	220	26.39	224	6.220	237	31.15	108	23.89	27
28.9	36.422	316	14.98	15	10.629	249	24.15	216	6.457	265	32.23	117	24.16	33
July 8.9	36.738	340	15.13	35	10.878	270	21.99	203	6.722	285	33.40	121	24.49	39
18.8	37.078	358	15.48	54	11.148	286	19.96	185	7.007	299	34.61	123	24.88	44
28.8	37.436	366	16.02	72	11.434	296	18.11	158	7.306	309	35.84	118	25.32	47
Aug. 7.8	37.802	369	16.74	86	11.730	300	16.53	128	7.615	310	37.02	113	25.79	49
17.8	38.171	364	17.60	99	12.030	297	15.25	93	7.925	306	38.15	102	26.28	50
27.7	38.535	354	18.59	108	12.327	288	14.32	55	8.231	298	39.17	87	26.78	49
Sept. 6.7	38.889	341	19.67	114	12.615	276	13.77	14	8.529	286	40.04	70	27.27	47
16.7	39.230	322	20.81	120	12.891	259	13.63	26	8.815	271	40.74	53	27.74	44
26.6	39.552	300	22.01	121	13.150	239	13.89	65	9.086	251	41.27	35	28.18	39
Oct. 6.6	39.852	276	23.22	121	13.389	215	14.54	100	9.337	231	41.62	16	28.57	34
16.6	40.128	246	24.43	120	13.604	190	15.54	132	9.568	206	41.78	0	28.91	28
26.6	40.374	215	25.63	117	13.794	161	16.86	158	9.774	180	41.78	15	29.19	19
Nov. 5.5	40.589	180	26.80	114	13.955	130	18.44	176	9.954	151	41.63	28	29.38	12
15.5	40.769	142	27.94	109	14.085	97	20.20	187	10.105	120	41.35	37	29.50	4
25.5	40.911	100	29.03	102	14.182	62	22.07	192	10.225	85	40.98	43	29.54	4
Dec. 5.5	41.011	55	30.05	93	14.244	25	23.99	188	10.310	50	40.55	47	29.50	12
15.4	41.066	9	30.98	81	14.269	11	25.87	178	10.360	11	40.08	50	29.38	20
25.4	41.075	38	31.79	65	14.258	48	27.65	162	10.371	27	39.58	50	29.18	26
35.4	41.037		32.44		14.210		29.27		10.344		39.08		28.92	
Mean Place	34.530		11.66		9.390		37.92		4.802		24.18		25.568	
Sec δ, Tan δ	1.229		+0.715		1.029		−0.245		1.023		+0.217		2.105	
$D_\psi a$, $D_\omega a$	+0.08		−0.03		+0.06		+0.01		+0.07		−0.01		+0.02	
$D_\psi \delta$, $D_\omega \delta$	+0.2		+0.9		+0.2		+0.9		+0.2		+0.9		+0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

[Wash]ington [Mea]n Time.	ν Tauri. Mag. 3.9 Right Ascension.		ν Tauri. Declination.		A Tauri. Mag. 4.5 Right Ascension.		A Tauri. Declination.		c Persei. Mag. 4.0 Right Ascension.		c Persei. Declination.		p Tauri. Mag. 5.6 Right Ascension.		p Tauri. Declination.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	3 58		+ 5 45		3 59		+21 51		4 2		+47 29		4 5		+26 15	
	s		″		s		″		s		″		s		″	
.. 0.4	46.472		41.07		49.395		31.11		40.744		45.44		48.730		64.88	
10.4	46.426	46	40.31	76	49.351	44	31.06	5	40.666	78	46.59	115	48.688	42	65.05	17
20.3	46.344	82	39.61	70	49.268	83	30.93	13	40.535	131	47.49	90	48.605	83	65.11	6
30.3	46.232	112	38.99	62	49.151	117	30.73	20	40.359	176	48.07	58	48.486	119	65.06	5
). 9.3	46.096	136	38.45	54	49.008	143	30.45	28	40.144	215	48.33	26	48.339	147	64.90	16
19.3	45.942	154	38.00	45	48.845	163	30.09	36	39.906	238	48.24	9	48.170	169	64.60	30
r. 1.2	45.780	162	37.65	35	48.674	171	29.66	43	39.657	249	47.82	42	47.991	179	64.18	42
11.2	45.619	161	37.43	22	48.504	170	29.17	49	39.411	246	47.06	76	47.813	178	63.66	52
21.2	45.469	150	37.32	11	48.348	156	28.65	52	39.182	229	46.02	104	47.648	165	63.06	60
31.1	45.341	128	37.34	2	48.212	136	28.12	53	38.986	196	44.73	129	47.504	144	62.41	65
r. 10.1	45.241	100	37.53	19	48.109	103	27.61	51	38.834	152	43.26	147	47.393	111	61.74	67
20.1	45.179	62	37.87	34	48.046	63	27.17	44	38.736	98	41.68	158	47.322	71	61.10	64
30.1	45.157	22	38.39	52	48.028	18	26.81	36	38.698	38	40.04	164	47.297	25	60.51	59
y 10.0	45.180	23	39.09	70	48.057	20	26.59	22	38.725	27	38.42	162	47.321	24	60.02	49
20.0	45.249	69	39.95	86	48.135	78	26.50	9	38.819	94	36.88	154	47.396	75	59.66	36
30.0	45.363	114	40.98	103	48.262	127	26.57	7	38.975	156	35.47	141	47.520	124	59.47	19
ie 9.0	45.519	156	42.17	119	48.434	172	26.83	26	39.193	218	34.26	121	47.693	173	59.43	4
18.9	45.714	195	43.46	129	48.647	213	27.24	41	39.466	273	33.26	100	47.907	214	59.57	14
28.9	45.941	227	44.84	138	48.896	249	27.81	57	39.787	321	32.52	74	48.159	252	59.88	31
y 8.9	46.197	256	46.27	143	49.173	277	28.53	72	40.148	361	32.04	48	48.440	281	60.35	47
18.8	46.473	276	47.71	144	49.473	300	29.35	82	40.540	392	31.85	19	48.747	307	60.97	62
28.8	46.765	292	49.10	139	49.788	315	30.27	92	40.954	414	31.92	7	49.070	323	61.71	74
g. 7.8	47.065	300	50.41	131	50.112	324	31.25	98	41.381	427	32.25	33	49.402	332	62.54	83
17.8	47.367	302	51.57	116	50.439	327	32.24	99	41.814	433	32.83	58	49.739	337	63.43	89
27.7	47.667	300	52.58	101	50.763	324	33.22	98	42.245	431	33.65	82	50.074	335	64.35	92
pt. 6.7	47.959	292	53.37	79	51.079	316	34.16	94	42.667	422	34.66	101	50.402	328	65.26	91
16.7	48.239	280	53.94	57	51.382	303	35.03	87	43.076	409	35.87	121	50.718	316	66.16	90
26.7	48.503	264	54.26	32	51.670	288	35.81	78	43.464	388	37.22	135	51.018	300	67.02	86
:t. 6.6	48.750	247	54.35	9	51.939	269	36.49	68	43.827	363	38.70	148	51.301	283	67.82	80
16.6	48.976	226	54.20	15	52.186	247	37.07	58	44.163	336	40.30	160	51.561	260	68.54	72
26.6	49.178	202	53.85	35	52.408	222	37.55	48	44.465	302	41.98	168	51.798	237	69.21	67
ov. 5.5	49.354	176	53.33	52	52.604	196	37.94	39	44.730	265	43.71	173	52.007	209	69.81	60
15.5	49.503	149	52.65	68	52.769	165	38.23	29	44.952	222	45.47	176	52.183	176	70.34	53
25.5	49.620	117	51.87	78	52.902	133	38.44	21	45.126	174	47.22	175	52.327	144	70.82	48
ec. 5.5	49.703	83	51.04	83	52.999	97	38.60	16	45.249	123	48.92	170	52.433	106	71.23	41
15.4	49.751	48	50.18	86	53.057	58	38.69	9	45.317	68	50.53	161	52.499	66	71.58	35
25.4	49.761	10	49.33	85	53.074	17	38.72	3	45.327	10	52.00	147	52.522	23	71.87	29
35.4	49.734	27	48.53	80	53.051	23	38.70	2	45.279	48	53.29	129	52.503	19	72.07	20
[Mea]n Place	44.381		35.51		47.139		21.96		37.844		31.39		46.378		55.08	
[Sec] δ, Tan δ	1.005		+0.101		1.077		+0.401		1.480		+1.091		1.115		+0.494	
[dα], D_μ α	+0.06		0.00		+0.07		−0.01		+0.09		−0.04		+0.07		−0.02	
[dδ], D_μ δ	+0.2		+0.9		+0.2		+0.9		+0.2		+0.9		+0.2		+0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	o^1 Eridani. Mag. 4.1 Right Ascension.		Declination.		μ Tauri. Mag. 4.3 Right Ascension.		Declination.		α Horologii. Mag. 3.8 Right Ascension.		Declination.		α Retic[uli] Mag. 3.[…] Right Ascension.	
	h m		° ′		h m		° ′		h m		° ′		h m	
	4 7		− 7 2		4 11		+ 8 41		4 11		−42 29		4 13	
	s		″		s		″		s		″		s	
Jan. 0.4	50.851	50	68.69	131	3.707	40	13.26	66	17.286	136	59.52	232	23.87	30
10.4	50.801	86	70.00	113	3.667	73	12.60	61	17.150	178	61.84	191	23.57	37
20.3	50.715	117	71.13	94	3.594	106	11.99	56	16.972	215	63.75	146	23.20	41
30.3	50.598	141	72.07	72	3.488	133	11.43	50	16.757	243	65.21	98	22.79	46
Feb. 9.3	50.457	161	72.79	50	3.355	153	10.93	42	16.514	263	66.19	47	22.33	48
19.3	50.296	169	73.29	26	3.202	164	10.51	35	16.251	271	66.66	3	21.85	49
Mar. 1.2	50.127	169	73.55	3	3.038	163	10.16	28	15.980	269	66.63	52	21.36	48
11.2	49.958	159	73.58	22	2.875	154	9.88	17	15.711	256	66.11	100	20.88	46
21.2	49.799	141	73.36	45	2.721	136	9.71	7	15.455	233	65.11	145	20.42	43
31.2	49.658	112	72.91	70	2.585	107	9.64	5	15.222	199	63.66	184	19.99	38
Apr. 10.1	49.546	78	72.21	93	2.478	72	9.69	20	15.023	158	61.82	223	19.61	32
20.1	49.468	38	71.28	117	2.406	31	9.89	34	14.865	110	59.59	256	19.29	23
30.1	49.430	5	70.11	136	2.375	13	10.23	50	14.755	58	57.03	281	19.06	17
May 10.0	49.435	50	68.75	156	2.388	59	10.73	67	14.697	1	54.22	302	18.89	9
20.0	49.485	94	67.19	172	2.447	105	11.40	82	14.696	54	51.20	315	18.80	0
30.0	49.579	138	65.47	184	2.552	147	12.22	97	14.750	109	48.05	320	18.80	8
June 9.0	49.717	177	63.63	191	2.699	186	13.19	109	14.859	161	44.85	319	18.88	17
18.9	49.894	212	61.72	195	2.885	222	14.28	120	15.020	210	41.66	307	19.05	25
28.9	50.106	240	59.77	193	3.107	251	15.48	126	15.230	252	38.59	289	19.30	32
July 8.9	50.346	264	57.84	184	3.358	273	16.74	127	15.482	287	35.70	262	19.62	38
18.9	50.610	280	56.00	170	3.631	289	18.01	126	15.769	316	33.08	227	20.00	42
28.8	50.890	291	54.30	151	3.920	299	19.27	119	16.085	336	30.81	184	20.42	47
Aug. 7.8	51.181	296	52.79	126	4.219	305	20.46	110	16.421	349	28.97	136	20.89	50
17.8	51.477	294	51.53	98	4.524	303	21.56	96	16.770	353	27.61	82	21.39	51
27.7	51.771	289	50.55	64	4.827	297	22.52	78	17.123	348	26.79	25	21.90	51
Sept. 6.7	52.060	279	49.91	30	5.124	287	23.30	59	17.471	337	26.54	33	22.41	49
16.7	52.339	263	49.61	4	5.411	274	23.89	37	17.808	319	26.87	92	22.90	47
26.7	52.602	247	49.65	40	5.685	256	24.26	15	18.127	294	27.79	146	23.37	43
Oct. 6.6	52.849	227	50.05	72	5.941	238	24.41	5	18.421	263	29.25	196	23.80	37
16.6	53.076	202	50.77	100	6.179	214	24.36	25	18.684	225	31.21	239	24.17	30
26.6	53.278	176	51.77	126	6.393	191	24.11	41	18.909	186	33.60	274	24.47	24
Nov. 5.6	53.454	148	53.03	142	6.584	161	23.70	54	19.095	140	36.34	299	24.71	15
15.5	53.602	115	54.45	155	6.745	131	23.16	63	19.235	91	39.33	311	24.86	8
25.5	53.717	81	56.00	160	6.876	98	22.53	70	19.326	42	42.44	313	24.94	1
Dec. 5.5	53.798	46	57.60	159	6.974	61	21.83	72	19.368	10	45.57	302	24.93	10
15.4	53.844	8	59.19	153	7.035	23	21.11	73	19.358	60	48.59	284	24.83	18
25.4	53.852	31	60.72	142	7.058	16	20.38	71	19.298	109	51.43	255	24.65	28
35.4	53.821		62.14		7.042		19.67		19.189		53.98		24.37	
Mean Place	48.789		71.25		1.544		7.40		15.072		55.70		21.071	
Sec δ, Tan δ	1.008		−0.124		1.012		+0.153		1.356		−0.916		2.179	
$D_\psi \alpha$, $D_\omega \alpha$	+0.06		0.00		+0.06		0.00		+0.04		+0.03		+0.02	
$D_\psi \delta$, $D_\omega \delta$	+0.2		+0.9		+0.2		+0.9		+0.2		+0.9		+0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

...ngton ...Time.	γ Tauri. Mag. 3.9				δ Tauri. Mag. 3.9				υ^5 Eridani. Mag. 4.1				δ Mensæ. Mag. 5.6			
	Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.	
	h m 4 15		° ′ +15 25		h m 4 18		° ′ +17 20		h m 4 20		° ′ −34 12		h m 4 23		° ′ −80 24
	s		″		s		″		s		″		s		″	
0.4	6.319	32	48.46	35	11.035	30	63.11	25	57.291	94	34.94	225	38.89	102	39.97	241
10.4	6.287	71	48.11	35	11.005	70	62.86	27	57.197	135	37.19	189	37.87	120	42.38	194
20.3	6.216	105	47.76	36	10.935	105	62.59	29	57.062	172	39.08	149	36.67	132	44.32	142
30.3	6.111	134	47.40	36	10.830	134	62.30	31	56.890	201	40.57	105	35.35	142	45.74	86
9.3	5.977	155	47.04	37	10.696	156	61.99	34	56.689	220	41.62	60	33.93	147	46.60	31
19.3	5.822	166	46.67	36	10.540	169	61.65	36	56.469	232	42.22	15	32.46	150	46.91	24
1.2	5.656	168	46.31	36	10.371	170	61.29	37	56.237	232	42.37	30	30.96	147	46.67	81
11.2	5.488	158	45.95	33	10.201	161	60.92	37	56.005	223	42.07	75	29.49	143	45.86	131
21.2	5.330	140	45.62	28	10.040	142	60.55	34	55.782	203	41.32	116	28.06	133	44.55	177
31.2	5.190	110	45.34	21	9.898	113	60.21	29	55.579	175	40.16	156	26.73	120	42.78	222
10.1	5.080	74	45.13	13	9.785	77	59.92	21	55.404	137	38.60	191	25.53	105	40.56	258
20.1	5.006	33	45.00	1	9.708	35	59.71	12	55.267	95	36.69	223	24.48	88	37.98	287
30.1	4.973	12	44.99	11	9.673	11	59.59	1	55.172	46	34.46	251	23.60	69	35.11	315
10.0	4.985	60	45.10	27	9.684	58	59.60	14	55.126	4	31.95	271	22.91	49	31.96	331
20.0	5.045	106	45.37	41	9.742	105	59.74	30	55.130	54	29.24	286	22.42	27	28.65	340
30.0	5.151	151	45.78	57	9.847	150	60.04	44	55.184	104	26.38	296	22.15	2	25.25	342
e 9.0	5.302	192	46.35	71	9.997	190	60.48	59	55.288	152	23.42	297	22.13	19	21.83	336
18.9	5.494	227	47.06	82	10.187	227	61.07	72	55.440	195	20.45	291	22.32	40	18.47	310
28.9	5.721	257	47.88	93	10.414	258	61.79	82	55.635	232	17.54	277	22.72	61	15.28	299
y 8.9	5.978	279	48.81	100	10.672	280	62.61	90	55.867	266	14.77	253	23.33	80	12.29	260
18.9	6.257	297	49.81	102	10.952	299	63.51	95	56.133	290	12.24	224	24.13	95	9.69	221
28.8	6.554	309	50.83	103	11.251	310	64.46	96	56.423	310	10.00	188	25.08	110	7.48	174
g. 7.8	6.863	312	51.86	99	11.561	315	65.42	94	56.733	321	8.12	143	26.18	120	5.74	119
17.8	7.175	312	52.85	91	11.876	315	66.36	88	57.054	325	6.69	94	27.38	125	4.55	62
27.7	7.487	305	53.76	81	12.191	310	67.24	80	57.379	323	5.75	42	28.63	128	3.93	1
pt. 6.7	7.792	298	54.57	66	12.501	300	68.04	67	57.702	313	5.33	12	29.91	125	3.94	63
16.7	8.090	284	55.23	52	12.801	289	68.71	55	58.015	299	5.45	66	31.16	119	4.57	125
26.7	8.374	267	55.75	38	13.090	273	69.26	42	58.314	279	6.11	119	32.35	108	5.82	182
t. 6.6	8.641	248	56.13	21	13.363	253	69.68	27	58.593	253	7.30	168	33.43	94	7.64	236
16.6	8.889	227	56.34	8	13.616	232	69.95	16	58.846	222	8.98	210	34.37	75	10.00	278
26.6	9.116	201	56.42	6	13.848	207	70.11	4	59.068	190	11.08	245	35.12	54	12.78	314
v. 5.6	9.317	173	56.36	14	14.055	179	70.15	5	59.258	151	13.53	270	35.66	30	15.92	336
15.5	9.490	142	56.22	25	14.234	147	70.10	12	59.409	110	16.23	284	35.96	6	19.28	345
25.5	9.632	107	55.97	29	14.381	113	69.98	18	59.519	66	19.07	290	36.02	20	22.73	346
c. 5.5	9.739	70	55.68	32	14.494	74	69.80	21	59.585	21	21.97	284	35.82	44	26.19	329
15.4	9.809	30	55.36	35	14.568	33	69.59	25	59.606	25	24.81	269	35.38	69	29.48	306
25.4	9.839	10	55.01	36	14.601	7	69.34	26	59.581	71	27.50	244	34.69	90	32.54	271
35.4	9.829		54.65		14.594		69.08		59.510		29.94		33.79		35.25	
...n Place	4.077		41.32		8.755		55.71		55.139		32.57		32.981		33.81	
...δ, Tan δ	1.037		+0.276		1.048		+0.312		1.209		−0.680		6.001		−5.917	
...α, D_α α	+0.07		−0.01		+0.07		−0.01		+0.04		+0.02		−0.08		+0.16	
...δ, D_δ δ	+0.2		+0.9		+0.2		+0.9		+0.2		+0.9		+0.2		+0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ε Tauri. Mag. 3.6 Right Ascension.		ε Tauri. Declination.		m Persei. Mag. 6.1 Right Ascension.		m Persei. Declination.		α Tauri. (Aldebaran.) Mag. 1.1 Right Ascension.		α Tauri. Declination.		ν Erida[ni] Mag. 4 Right Ascension.	
	h m		° ′		h m		° ′		h m		° ′		h m	
	4 23		+18 59		4 27		+42 53		4 31		+16 20		4 32	
	s		″		s		″		s		″		s	
Jan. 0.4	48.409		57.91		37.138		27.48		11.674		42.95		12.385	
10.4	48.383	26	57.74	17	37.099	39	28.52	104	11.655	19	42.65	30	12.355	30
20.4	48.317	66	57.55	19	37.006	93	29.38	86	11.594	61	42.34	31	12.287	68
30.3	48.214	103	57.31	24	36.865	141	29.99	61	11.497	97	42.03	31	12.186	101
Feb. 9.3	48.081	133	57.05	26	36.684	181	30.34	35	11.367	130	41.71	32	12.054	132
19.3	47.925	156	56.75	30	36.474	210	30.42	8	11.215	152	41.39	32	11.900	154
Mar. 1.2	47.754	171	56.40	35	36.248	226	30.20	22	11.046	169	41.06	33	11.731	169
11.2	47.581	173	56.03	37	36.018	230	29.71	49	10.874	172	40.73	33	11.560	171
21.2	47.417	164	55.65	38	35.799	219	28.94	77	10.710	164	40.41	32	11.395	165
31.2	47.271	146	55.28	37	35.603	196	27.96	98	10.561	149	40.12	29	11.244	151
Apr. 10.1	47.153	118	54.93	35	35.443	160	26.79	117	10.440	121	39.90	22	11.119	125
20.1	47.071	82	54.64	29	35.329	114	25.51	128	10.353	87	39.73	17	11.025	94
30.1	47.031	40	54.45	19	35.268	61	24.16	135	10.306	47	39.66	7	10.969	56
May 10.1	47.037	6	54.36	9	35.267	1	22.79	137	10.305	1	39.70	4	10.956	13
20.0	47.090	53	54.40	4	35.325	58	21.47	132	10.350	45	39.88	18	10.987	31
30.0	47.191	101	54.58	18	35.443	118	20.26	121	10.441	91	40.20	32	11.063	76
June 9.0	47.338	147	54.91	33	35.618	175	19.18	108	10.578	137	40.65	45	11.181	118
18.9	47.525	187	55.37	46	35.846	228	18.28	90	10.756	178	41.23	58	11.339	158
28.9	47.750	225	55.97	60	36.122	276	17.58	70	10.971	215	41.94	71	11.532	193
July 8.9	48.006	256	56.69	72	36.438	316	17.09	49	11.217	246	42.74	80	11.757	225
18.9	48.286	280	57.49	80	36.786	348	16.83	26	11.488	271	43.61	87	12.008	251
28.8	48.586	300	58.35	86	37.159	373	16.79	4	11.778	290	44.51	90	12.277	269
Aug. 7.8	48.896	310	59.23	88	37.549	390	16.97	18	12.082	304	45.42	91	12.560	283
17.8	49.213	317	60.10	87	37.949	400	17.34	37	12.392	310	46.29	87	12.851	291
27.8	49.531	318	60.94	84	38.351	402	17.89	55	12.705	313	47.10	81	13.144	293
Sept. 6.7	49.845	314	61.70	76	38.748	397	18.62	73	13.015	310	47.80	70	13.436	292
16.7	50.150	305	62.36	66	39.138	390	19.49	87	13.317	302	48.39	59	13.721	285
26.7	50.444	294	62.91	55	39.515	377	20.48	99	13.609	292	48.84	45	13.994	273
Oct. 6.6	50.723	279	63.35	44	39.872	357	21.58	110	13.887	278	49.15	31	14.254	260
16.6	50.983	260	63.67	32	40.208	336	22.77	119	14.148	261	49.31	16	14.498	244
26.6	51.222	239	63.87	20	40.517	309	24.03	126	14.389	241	49.34	3	14.722	224
Nov. 5.6	51.436	214	63.97	10	40.794	277	25.36	133	14.606	217	49.26	8	14.921	199
15.5	51.624	188	63.99	2	41.034	240	26.72	136	14.797	191	49.09	17	15.093	172
25.5	51.778	154	63.95	4	41.232	198	28.10	138	14.956	159	48.85	24	15.236	143
Dec. 5.5	51.897	119	63.86	9	41.383	151	29.47	137	15.080	124	48.56	29	15.344	108
15.5	51.978	81	63.74	12	41.483	100	30.80	133	15.166	86	48.25	31	15.415	71
25.4	52.018	40	63.59	15	41.528	45	32.05	125	15.213	47	47.93	32	15.447	32
35.4	52.015	3	63.42	17	41.519	9	33.17	112	15.216	3	47.61	32	15.440	7
Mean Place	46.086		50.43		34.256		15.99		9.358		36.31		10.231	
Sec δ, Tan δ	1.058		+0.344		1.365		+0.929		1.042		+0.293		1.002	
$D_\psi \alpha$, $D_\omega \alpha$	+0.07		0.01		+0.08		−0.02		+0.07		−0.01		+0.06	
$D_\psi \delta$, $D_\omega \delta$	+0.2		+0.9		+0.2		+0.9		+0.2		+0.9		+0.1	

FOR THE UPPER TRANSIT AT WASHINGTON.

…ton … Time.	α Doradus. Mag. 3.5 Right Ascension.	Diff.	Declination.	Diff.	53 Eridani. Mag. 4.0 Right Ascension.	Diff.	Declination.	Diff.	τ Tauri. Mag. 4.3 Right Ascension.	Diff.	Declination.	Diff.	Groombridge 848. Mag. 6.0 Right Ascension.	Diff.	Declination.	Diff.
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	4 32		−55 12		4 34		−14 27		4 37		+22 47		4 37		+75 47	
	s		″		s		″		s		″		s		″	
. 0.4	14.670		63.39		24.776		54.47		18.124		62.86		45.55		46.56	
10.4	14.475	195	66.05	266	24.736	40	56.19	172	18.110	14	62.89	3	45.29	26	49.08	252
20.4	14.223	252	68.27	222	24.656	80	57.69	150	18.051	59	62.88	1	44.88	41	51.26	218
30.3	13.922	301	70.01	174	24.541	115	58.93	124	17.954	97	62.81	7	44.33	55	53.03	177
. 9.3	13.583	339	71.24	123	24.397	144	59.90	97	17.822	132	62.68	13	43.68	65	54.31	128
19.3	13.217	366	71.91	67	24.230	167	60.56	66	17.663	159	62.47	21	42.93	75	55.06	75
. 1.3	12.836	381	72.04	13	24.050	180	60.92	36	17.489	174	62.20	27	42.15	78	55.24	18
11.2	12.454	382	71.63	41	23.865	185	60.97	5	17.310	179	61.86	34	41.36	79	54.86	38
21.2	12.084	370	70.68	95	23.687	178	60.71	26	17.136	174	61.46	40	40.60	76	53.94	92
31.2	11.740	344	69.24	144	23.524	163	60.16	55	16.980	156	61.02	44	39.92	68	52.50	144
. 10.1	11.433	307	67.36	188	23.384	140	59.31	85	16.850	130	60.57	45	39.32	60	50.65	185
20.1	11.172	261	65.05	231	23.278	106	58.18	113	16.755	95	60.14	43	38.85	47	48.42	223
30.1	10.967	205	62.39	266	23.210	68	56.79	139	16.703	52	59.75	39	38.53	32	45.92	250
· 10.1	10.826	141	59.43	296	23.183	27	55.16	163	16.697	6	59.45	30	38.37	16	43.26	266
20.0	10.751	75	56.25	318	23.201	18	53.33	183	16.739	42	59.26	19	38.37	0	40.50	276
30.0	10.746	5	52.91	334	23.265	64	51.34	199	16.829	90	59.17	9	38.55	18	37.75	275
з 9.0	10.809	63	49.50	341	23.372	107	49.21	213	16.966	137	59.23	6	38.88	33	35.09	266
19.0	10.941	132	46.10	340	23.520	148	47.00	221	17.147	181	59.43	20	39.36	48	32.60	249
28.9	11.138	197	42.80	330	23.705	185	44.79	221	17.366	219	59.75	32	39.99	63	30.34	226
8.9	11.392	254	39.70	310	23.923	218	42.62	217	17.618	252	60.19	44	40.75	76	28.37	197
18.9	11.698	306	36.86	284	24.167	244	40.57	205	17.896	278	60.74	55	41.61	86	26.75	162
28.8	12.049	351	34.40	246	24.434	267	38.69	188	18.196	300	61.37	63	42.55	94	25.50	125
. 7.8	12.433	384	32.38	202	24.715	281	37.06	163	18.509	313	62.06	69	43.56	101	24.64	86
17.8	12.842	409	30.88	150	25.006	291	35.70	136	18.830	321	62.76	70	44.62	106	24.19	45
27.8	13.266	424	29.95	93	25.301	295	34.70	100	19.155	325	63.46	70	45.71	109	24.16	3
t. 6.7	13.693	427	29.62	33	25.594	293	34.09	61	19.478	323	64.13	67	46.80	109	24.55	39
16.7	14.114	421	29.91	29	25.882	288	33.88	21	19.795	317	64.75	62	47.88	108	25.35	80
26.7	14.516	402	30.85	94	26.158	276	34.09	21	20.101	306	65.29	54	48.94	106	26.55	120
. 6.7	14.891	375	32.38	153	26.419	261	34.72	63	20.395	294	65.76	47	49.94	100	28.12	157
16.6	15.228	337	34.46	208	26.664	245	35.73	101	20.672	277	66.14	38	50.88	94	30.03	191
26.6	15.520	292	37.03	257	26.887	223	37.07	134	20.928	256	66.44	30	51.73	85	32.26	223
v. 5.6	15.757	237	40.00	297	27.084	197	38.72	165	21.161	233	66.67	23	52.47	74	34.76	250
15.5	15.936	179	43.24	324	27.252	168	40.59	187	21.366	205	66.85	18	53.11	64	37.48	272
25.5	16.050	114	46.65	341	27.389	137	42.60	201	21.539	173	66.99	14	53.60	49	40.35	287
c. 5.5	16.096	46	50.11	346	27.490	101	44.68	208	21.677	138	67.09	10	53.94	34	43.30	295
15.5	16.073	23	53.49	338	27.553	63	46.76	208	21.774	97	67.18	9	54.11	17	46.25	295
25.4	15.980	93	56.69	320	27.575	22	48.76	200	21.828	54	67.24	6	54.12	1	49.11	286
35.4	15.822	158	59.58	289	27.556	19	50.62	186	21.838	10	67.27	3	53.97	15	51.79	268
…Place	12.109		58.87		22.647		55.42		15.692		55.34		38.363		32.16	
…, Tan δ	1.753		−1.440		1.033		−0.258		1.085		+0.420		4.075		+3.951	
…, $D_\omega \alpha$	+0.03		+0.03		+0.05		+0.01		+0.07		−0.01		+0.16		−0.09	
…, $D_\omega \delta$	+0.1		+0.9		+0.1		+0.9		+0.1		+0.9		+0.1		+0.9	

FOR THE UPPER TRANSIT AT .

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11 Orionis. Mag. 4.6				η Aurigæ. Mag. 3.3				ε Leporis. Mag. 3.3				β Eridani. Mag. 2.9			
Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.	
h m 4 59		° ′ +15 17		h m 5 0		° ′ +41 7		h m 5 1		° ′ −22 28		h m 5 3		° ′ − 5 11	
s		″		s		″		s		″		s		″	
51.898		27.48		44.512		33.07		59.012		54.42		48.376		31.92	
51.903	5	27.10	38	44.511	1	34.11	104	58.981	31	56.59	217	48.370	6	33.38	146
51.864	39	26.75	35	44.454	57	35.02	91	58.906	75	58.52	193	48.323	47	34.67	129
51.783	81	26.43	32	44.345	109	35.76	74	58.791	115	60.14	162	48.236	87	35.77	110
51.667	116	26.13	30	44.190	155	36.30	54	58.643	148	61.42	128	48.115	121	36.67	90
51.523	144	25.86	27	44.000	190	36.60	30	58.467	176	62.34	92	47.968	147	37.34	67
51.358	165	25.60	26	43.784	216	36.65	5	58.273	194	62.89	55	47.800	168	37.80	46
51.185	173	25.35	25	43.557	227	36.43	22	58.070	203	63.06	17	47.624	176	38.02	22
51.013	172	25.13	22	43.333	224	35.96	47	57.869	201	62.86	20	47.449	175	38.03	1
50.854	159	24.93	20	43.126	207	35.25	71	57.679	190	62.29	57	47.286	163	37.80	23
50.716	138	24.78	15	42.947	179	34.35	90	57.511	168	61.38	91	47.141	145	37.36	44
50.609	107	24.69	9	42.808	139	33.30	105	57.371	140	60.13	125	47.025	116	36.69	67
50.539	70	24.67	2	42.716	92	32.13	117	57.268	103	58.57	156	46.945	80	35.81	88
50.512	27	24.75	8	42.677	39	30.92	121	57.206	62	56.75	182	46.904	41	34.72	109
50.530	18	24.95	20	42.696	19	29.70	122	57.188	18	54.68	207	46.904	0	33.45	127
50.594	64	25.26	31	42.772	76	28.54	116	57.216	28	52.42	226	46.949	45	32.02	143
50.702	108	25.69	43	42.905	133	27.45	109	57.289	73	50.02	240	47.037	88	30.45	157
50.852	150	26.23	54	43.091	186	26.48	97	57.406	117	47.54	248	47.165	128	28.77	168
51.040	188	26.86	63	43.326	235	25.66	82	57.563	157	45.04	250	47.331	166	27.05	172
51.262	222	27.58	72	43.602	276	25.01	65	57.756	193	42.60	244	47.530	199	25.33	172
51.513	251	28.35	77	43.915	313	24.53	48	57.981	225	40.28	232	47.757	227	23.66	167
51.785	272	29.14	79	44.257	342	24.24	29	58.232	251	38.17	211	48.007	250	22.08	158
52.073	288	29.92	78	44.620	363	24.11	13	58.504	272	36.31	186	48.274	267	20.67	141
52.374	301	30.65	73	44.998	378	24.15	4	58.789	285	34.79	152	48.554	280	19.47	120
52.681	307	31.31	66	45.384	386	24.35	20	59.085	296	33.67	112	48.841	287	18.52	95
52.989	308	31.86	55	45.774	390	24.69	34	59.384	299	32.98	69	49.132	291	17.88	64
53.294	305	32.29	43	46.162	388	25.16	47	59.683	299	32.76	22	49.421	289	17.57	31
53.594	300	32.57	28	46.543	381	25.75	59	59.975	292	33.02	26	49.704	283	17.58	1
53.883	289	32.69	12	46.913	370	26.45	70	60.257	282	33.76	74	49.978	274	17.95	37
54.160	277	32.67	2	47.265	352	27.24	79	60.524	267	34.96	120	50.239	261	18.66	71
54.420	260	32.51	16	47.598	333	28.12	88	60.770	246	36.58	162	50.484	245	19.65	99
54.660	240	32.24	27	47.903	305	29.08	96	60.991	221	38.54	196	50.709	225	20.91	126
54.874	214	31.88	36	48.177	274	30.12	104	61.185	194	40.79	225	50.908	199	22.36	145
55.060	186	31.46	42	48.413	236	31.21	109	61.345	160	43.22	243	51.078	170	23.97	161
55.212	152	31.02	44	48.605	192	32.35	114	61.468	123	45.76	254	51.216	138	25.64	167
55.326	114	30.56	46	48.746	141	33.50	115	61.550	82	48.31	255	51.316	100	27.33	169
55.398	72	30.12	44	48.834	88	34.64	114	61.588	38	50.79	248	51.376	60	28.97	164
55.427	29	29.71	41	48.867	33	35.73	109	61.582	6	53.11	232	51.394	18	30.50	153
49.503		22.30		41.525		24.32		56.812		54.23		46.147		34.02	
1.037		+0.273		1.328		+0.873		1.082		−0.414		1.004		−0.091	
+0.07		0.00		+0.08		−0.02		+0.05		+0.01		+0.08		0.00	
+0.1		+1.0		+0.1		+1.0		+0.1		+1.0		+0.1		+1.0	

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n .	22 H. Camelop. Mag. 4.7				η Geminorum. Var. 3.2–4.2				2 Lyncis. Mag. 4.4				ζ Canis Majoris. Mag. 3.1			
	Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.	
	h m 6 9		° ′ +69 20		h m 6 9		° ′ +22 31		h m 6 12		° ′ +59 2		h m 6 17		° ′ −30 1	
	s		″		s		″		s		″		s		″	
.5	48.24		67.75		54.755		56.99		22.586		37.09		9.844		33.95	
.5	48.33	9	70.28	253	54.829	74	56.93	6	22.679	93	39.14	205	9.874	30	36.82	287
.4	48.30	— 3	72.73	245	54.851	22	56.95	— 2	22.682	3	41.15	201	9.851	— 23	39.48	266
.4	48.13	17	75.01	228	54.823	— 28	57.02	7	22.597	— 85	43.03	188	9.778	73	41.87	239
.4	47.85	28	77.00	199	54.747	76	57.11	9	22.432	165	44.69	166	9.658	120	43.91	204
.3	47.47	38	78.64	164	54.630	117	57.21	10	22.196	236	46.09	140	9.498	160	45.57	166
.3	47.02	45	79.86	122	54.482	148	57.28	7	21.904	292	47.13	104	9.308	190	46.83	126
.3	46.51	51	80.61	75	54.310	172	57.31	3	21.574	330	47.78	65	9.094	214	47.69	86
.3	45.97	54	80.87	26	54.128	182	57.30	— 1	21.222	352	48.02	24	8.870	224	48.11	42
.2	45.44	53	80.62	— 25	53.945	183	57.23	7	20.872	350	47.84	— 18	8.645	225	48.11	0
.2	44.93	51	79.88	74	53.775	170	57.10	13	20.539	333	47.25	59	8.430	215	47.69	42
.2	44.47	46	78.69	119	53.625	150	56.94	16	20.241	298	46.29	96	8.233	197	46.87	82
.2	44.09	38	77.09	160	53.506	119	56.74	20	19.992	249	44.98	131	8.064	169	45.67	120
.1	43.80	29	75.16	193	53.424	82	56.53	21	19.805	187	43.39	159	7.927	137	44.12	155
.1	43.60	20	72.95	221	53.382	42	56.33	20	19.688	117	41.58	181	7.830	97	42.27	185
.1	43.50	10	70.56	239	53.383	— 1	56.15	18	19.647	41	39.61	197	7.776	54	40.13	214
.0	43.52	— 2	68.05	251	53.429	46	56.01	14	19.684	— 37	37.54	207	7.765	11	37.78	235
.0	43.66	14	65.47	258	53.519	90	55.91	10	19.796	112	35.44	210	7.798	— 33	35.27	251
.0	43.90	24	62.93	254	53.650	131	55.87	4	19.984	188	33.35	209	7.874	76	32.65	262
.0	44.24	34	60.48	245	53.819	169	55.87	0	20.240	256	31.34	201	7.992	118	30.02	263
8.9	44.67	43	58.17	231	54.022	203	55.91	4	20.559	319	29.45	189	8.148	156	27.46	256
8.9	45.19	52	56.06	211	54.253	231	55.97	6	20.936	377	27.72	173	8.339	191	25.04	242
7.9	45.78	59	54.18	188	54.511	258	56.05	8	21.359	423	26.19	153	8.562	223	22.84	220
7.9	46.44	66	52.59	159	54.788	277	56.11	6	21.824	465	24.86	133	8.812	250	20.93	191
7.8	47.14	70	51.29	130	55.082	294	56.15	4	22.322	498	23.78	108	9.084	272	19.39	154
6.8	47.88	74	50.30	99	55.389	307	56.14	— 1	22.844	522	22.94	84	9.374	290	18.29	110
6.8	48.65	77	49.66	64	55.703	314	56.06	8	23.386	542	22.37	57	9.679	305	17.69	60
6.7	49.43	78	49.38	28	56.023	320	55.91	15	23.937	551	22.08	29	9.989	310	17.61	8
6.7	50.22	79	49.47	— 9	56.345	322	55.68	23	24.491	554	22.07	1	10.303	314	18.08	— 47
6.7	50.99	77	49.91	44	56.664	319	55.39	29	25.039	548	22.35	— 28	10.614	311	19.08	100
6.7	51.75	76	50.73	82	56.976	312	55.05	34	25.572	533	22.92	57	10.915	301	20.59	151
5.6	52.46	71	51.91	118	57.276	300	54.67	38	26.083	511	23.78	86	11.202	287	22.57	198
5.6	53.12	66	53.44	153	57.560	284	54.29	38	26.558	475	24.92	114	11.465	263	24.94	237
5.6	53.70	58	55.27	183	57.820	260	53.92	37	26.988	430	26.31	139	11.701	236	27.64	270
5.6	54.20	50	57.38	211	58.050	230	53.59	33	27.360	372	27.95	164	11.900	199	30.56	292
5.5	54.60	40	59.70	232	58.243	193	53.34	25	27.666	306	29.77	182	12.057	157	33.60	304
5.5	54.80	20	62.16	246	58.392	149	53.15	19	27.894	228	31.73	196	12.167	110	36.64	304
5.5	55.04	15	64.71	255	58.494	102	53.05	10	28.036	142	33.77	204	12.227	60	39.62	298
ace	42.225		63.47		52.098		54.92		18.204		33.52		7.529		34.03	
an δ	2.836		+2.654		1.083		+0.415		1.944		+1.667		1.155		−0.578	
α	+0.13		+0.01		+0.07		0.00		+0.11		+0.01		+0.05		0.00	
δ	0.0		+1.0		0.0		+1.0		0.0		+1.0		0.0		+1.0	

FOR THE UPPER TRANSIT AT .

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..ington ..Time.	α Argus. (*Canopus.*) Mag. −0.9 Right Ascension.		Declination.		10 Monocerotis. Mag. 5.0 Right Ascension.		Declination.	
	h m 6 22		° ′ −52 38		h m 6 23		° ′ − 4 42	
	s		″		s		″	
. 0.5	9.218		59.91		54.054		35.02	
10.5	9.197	21	63.41	350	54.121	67	36.74	172
20.4	9.103	94	66.69	328	54.141	20	38.29	155
30.4	8.943	160	69.65	296	54.114	27	39.65	136
). 9.4	8.722	221	72.22	257	54.042	72	40.80	115
19.4	8.450	272	74.35	213	53.932	110	41.74	94
r. 1.3	8.137	313	76.00	165	53.792	140	42.43	69
11.3	7.795	342	77.13	113	53.628	164	42.91	48
21.3	7.437	358	77.74	61	53.454	174	43.15	24
31.2	7.078	359	77.83	9	53.277	177	43.17	2
r. 10.2	6.730	348	77.40	43	53.109	168	42.97	20
20.2	6.403	327	76.46	94	52.957	152	42.57	40
30.2	6.109	294	75.06	140	52.831	126	41.97	60
y 10.1	5.857	252	73.22	184	52.735	96	41.16	81
20.1	5.654	203	70.98	224	52.675	60	40.18	98
30.1	5.506	148	68.41	257	52.653	22	39.03	115
ne 9.1	5.417	89	65.57	284	52.672	19	37.76	127
19.0	5.388	29	62.52	305	52.729	57	36.37	139
29.0	5.419	31	59.37	315	52.823	94	34.91	146
ly 9.0	5.512	93	56.18	319	52.953	130	33.42	149
18.9	5.662	150	53.06	312	53.115	162	31.95	147
28.9	5.867	205	50.10	296	53.306	191	30.55	140
g. 7.9	6.123	256	47.39	271	53.523	217	29.28	127
17.9	6.423	300	45.02	237	53.761	238	28.19	109
27.8	6.761	338	43.10	192	54.017	256	27.32	87
pt. 6.8	7.130	369	41.70	140	54.286	269	26.73	59
16.8	7.523	393	40.86	84	54.567	281	26.46	27
26.8	7.929	406	40.63	23	54.855	288	26.51	5
ct. 6.7	8.340	411	41.06	43	55.146	291	26.91	40
16.7	8.746	406	42.12	106	55.437	291	27.65	74
26.7	9.135	389	43.80	168	55.723	286	28.71	106
ov. 5.6	9.498	363	46.04	224	56.000	277	30.05	134
15.6	9.826	328	48.78	274	56.261	261	31.63	158
25.6	10.105	279	51.92	314	56.501	240	33.38	175
ec. 5.6	10.330	225	55.35	343	56.712	211	35.24	186
15.5	10.492	162	58.96	361	56.890	178	37.14	190
25.5	10.585	93	62.62	366	57.027	137	39.02	188
35.5	10.609	24	66.22	360	57.121	94	40.82	180
..n Place	6.565		*60.04*		*51.718*		*35.53*	
..δ, Tan δ	*1.648*		*−1.310*		*1.003*		*−0.082*	
.. $D_\psi \alpha$	*+0.03*		*−0.01*		*+0.06*		0.00	
$D_\psi \delta$	*0.0*		*+1.0*		*0.0*		+1.0	

..ington ..Time.	ν Geminorum. Mag. 4.1 Right Ascension.		Declination.		8 Lyncis. Mag. 6.0 Right Ascension.		Declination.	
	h m 6 24		° ′ +20 15		h m 6 30		° ′ +61 33	
	s		″		s		″	
. 0.5	4.729		57.84		11.32		22.60	
10.5	4.817	88	57.63	21	11.45	13	24.76	216
20.4	4.853	36	57.49	14	11.48	3	26.91	215
30.4	4.837	16	57.44	5	11.42	6	28.96	205
). 9.4	4.774	63	57.44	0	11.25	17	30.83	187
19.4	4.669	105	57.48	4	11.01	24	32.43	160
r. 1.3	4.531	138	57.53	5	10.71	30	33.69	126
11.3	4.366	165	57.58	5	10.36	35	34.56	87
21.3	4.188	178	57.60	2	9.98	38	35.03	47
31.2	4.008	180	57.59	1	9.59	39	35.04	1
r. 10.2	3.838	170	57.55	4	9.22	37	34.62	42
20.2	3.685	153	57.47	8	8.88	34	33.78	84
30.2	3.560	125	57.39	8	8.58	30	32.56	122
y 10.1	3.468	92	57.29	10	8.35	23	31.01	155
20.1	3.416	52	57.21	8	8.20	15	29.21	180
30.1	3.405	11	57.15	6	8.11	9	27.20	201
ne 9.1	3.437	32	57.11	4	8.11	0	25.03	217
19.0	3.512	75	57.12	1	8.19	8	22.79	224
29.0	3.627	115	57.16	4	8.35	16	20.54	225
ly 9.0	3.779	152	57.24	8	8.58	23	18.32	222
18.9	3.965	186	57.34	10	8.90	32	16.20	212
28.9	4.182	217	57.45	11	9.27	37	14.20	200
g. 7.9	4.424	242	57.55	10	9.69	42	12.38	182
17.9	4.688	264	57.62	7	10.16	47	10.77	161
27.8	4.969	281	57.64	2	10.67	51	9.37	140
pt. 6.8	5.265	296	57.58	6	11.22	55	8.24	113
16.8	5.573	308	57.44	14	11.79	57	7.37	87
26.8	5.886	313	57.20	24	12.37	58	6.80	57
ct. 6.7	6.203	317	56.87	33	12.96	59	6.53	27
16.7	6.521	318	56.44	43	13.55	59	6.56	3
26.7	6.834	313	55.94	50	14.14	59	6.92	36
ov. 5.6	7.136	302	55.39	55	14.70	56	7.61	69
15.6	7.425	289	54.82	57	15.23	53	8.60	99
25.6	7.691	266	54.25	57	15.71	48	9.91	131
ec. 5.6	7.930	239	53.71	54	16.14	43	11.50	159
15.5	8.132	202	53.24	47	16.50	36	13.31	181
25.5	8.294	162	52.86	38	16.77	27	15.31	200
35.5	8.408	114	52.58	28	16.95	18	17.45	214
..n Place	2.105		56.75		6.605		20.84	
..δ, Tan δ	1.066		+0.369		2.090		+1.846	
.. $D_\psi \alpha$	+0.07		0.00		+0.11		+0.02	
$D_\psi \delta$	0.0		+1.0		−0.1		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ξ^2 Canis Majoris. Mag. 4.5 Right Ascension.		ξ^2 Canis Majoris. Declination.		23 H. Camelop. Mag. 5.6 Right Ascension.		23 H. Camelop. Declination.		51 Aurigæ. Mag. 5.7 Right Ascension.		51 Aurigæ. Declination.		γ Gemi[norum] Mag. Right Ascension.	
	h m 6 31		° ′ −22 53		h m 6 32		° ′ +79 39		h m 6 32		° ′ +39 27		h m 6 32	
	s		″		s		″		s		″		s	
Jan. 0.5	36.979		51.59		16.68		27.96		57.687		55.71		57.628	
10.5	37.035	56	54.23	264	16.87	19	30.87	291	57.797	110	56.65	94	57.721	93
20.4	37.039	4	56.70	247	16.81	6	33.73	286	57.845	48	57.65	100	57.764	43
30.4	36.994	45	58.91	221	16.52	29	36.44	271	57.831	14	58.64	99	57.756	8
Feb. 9.4	36.903	91	60.83	192	15.98	54	38.88	244	57.759	72	59.59	95	57.700	56
19.4	36.772	131	62.41	158	15.25	73	40.96	208	57.634	125	60.43	84	57.603	97
Mar. 1.3	36.607	165	63.63	122	14.36	89	42.59	163	57.466	168	61.12	69	57.470	133
11.3	36.420	187	64.48	85	13.34	102	43.72	113	57.268	198	61.62	50	57.312	158
21.3	36.219	201	64.97	49	12.25	109	44.30	58	57.049	219	61.89	27	57.140	172
31.2	36.015	204	65.06	9	11.14	111	44.29	1	56.827	222	61.94	5	56.964	176
Apr. 10.2	35.818	197	64.80	26	10.06	108	43.73	56	56.614	213	61.75	19	56.795	169
20.2	35.637	181	64.18	62	9.06	100	42.63	110	56.420	194	61.35	40	56.643	152
30.2	35.480	157	63.22	96	8.17	89	41.05	158	56.258	162	60.75	60	56.517	126
May 10.1	35.354	126	61.94	128	7.42	75	39.03	202	56.136	122	59.96	79	56.421	96
20.1	35.263	91	60.37	157	6.86	56	36.67	236	56.059	77	59.05	91	56.364	57
30.1	35.211	52	58.56	181	6.49	37	34.01	266	56.031	28	58.04	101	56.346	18
June 9.1	35.200	11	56.52	204	6.32	17	31.17	284	56.053	22	56.97	107	56.369	23
19.0	35.230	30	54.34	218	6.38	6	28.21	296	56.127	74	55.86	111	56.433	64
29.0	35.300	70	52.05	229	6.63	25	25.22	299	56.250	123	54.76	110	56.537	104
July 9.0	35.409	109	49.73	232	7.10	47	22.26	296	56.419	169	53.69	107	56.676	139
18.9	35.553	144	47.44	229	7.76	66	19.41	285	56.630	211	52.66	103	56.850	174
28.9	35.731	178	45.27	217	8.60	84	16.75	266	56.878	248	51.69	97	57.053	203
Aug. 7.9	35.939	208	43.27	200	9.59	99	14.31	244	57.158	280	50.80	89	57.282	229
17.9	36.172	233	41.54	173	10.72	113	12.16	215	57.467	309	49.99	81	57.534	252
27.8	36.428	256	40.12	142	11.97	125	10.32	184	57.799	332	49.27	72	57.804	270
Sept. 6.8	36.702	274	39.09	103	13.33	136	8.85	147	58.150	351	48.62	65	58.088	284
16.8	36.989	287	38.51	58	14.75	142	7.76	109	58.515	365	48.05	57	58.384	296
26.8	37.286	297	38.40	11	16.22	147	7.08	68	58.891	376	47.58	47	58.690	306
Oct. 6.7	37.589	303	38.79	39	17.71	149	6.83	25	59.273	382	47.21	37	59.000	310
16.7	37.892	303	39.67	88	19.20	149	7.02	19	59.656	383	46.96	25	59.312	312
26.7	38.189	297	41.03	136	20.65	145	7.66	64	60.035	379	46.82	14	59.621	309
Nov. 5.6	38.476	287	42.81	178	22.02	137	8.73	107	60.404	369	46.81	1	59.921	300
15.6	38.744	268	44.97	216	23.31	129	10.24	151	60.755	351	46.95	14	60.209	288
25.6	38.989	245	47.41	244	24.47	116	12.13	189	61.082	327	47.26	31	60.476	267
Dec. 5.6	39.202	213	50.08	267	25.46	99	14.38	225	61.375	293	47.72	46	60.717	241
15.5	39.377	175	52.85	277	26.25	79	16.93	255	61.626	251	48.35	63	60.923	206
25.5	39.508	131	55.65	280	26.83	58	19.68	275	61.826	200	49.13	78	61.089	166
35.5	39.593	85	58.38	273	27.16	33	22.56	288	61.970	144	50.01	88	61.209	120
Mean Place	34.686		51.86		5.571		25.93		54.535		54.79		55.063	
Sec δ, Tan δ	1.086		−0.422		5.570		+5.479		1.295		+0.823		1.043	
$D_\psi \alpha$, $D_\omega \alpha$	+0.05		0.00		+0.20		+0.05		+0.08		+0.01		+0.07	
$D_\psi \delta$, $D_\omega \delta$	−0.1		+1.0		−0.1		+1.0		−0.1		+1.0		−0.1	

FOR THE UPPER TRANSIT AT WASHINGTON.

hington n Time.	ν Argus. Mag. 3.2				S Monocerotis. Mag. 4.7				ε Geminorum. Mag. 3.2				ξ Geminorum. Mag. 3.4			
	Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	6 35		−43 7		6 36		+ 9 58		6 38		+25 12		6 40		+12 59	
	s		″		s		″		s		″		s		″	
l. 0.5	15.825	26	21.06	338	26.918	91	24.77	89	52.322	106	52.19	5	40.411	97	10.10	72
10.5	15.851	36	24.44	317	27.009	42	23.88	76	52.428	53	52.24	15	40.508	48	9.38	60
20.4	15.815	96	27.61	289	27.051	7	23.12	63	52.481	3	52.39	23	40.556	2	8.78	47
30.4	15.719	149	30.50	253	27.044	53	22.49	50	52.478	53	52.62	27	40.554	50	8.31	36
b. 9.4	15.570	197	33.03	213	26.991	94	21.99	37	52.425	99	52.89	28	40.504	92	7.95	24
19.4	15.373	235	35.16	168	26.897	129	21.62	26	52.326	136	53.17	25	40.412	127	7.71	17
r. 1.3	15.138	263	36.84	120	26.768	154	21.36	16	52.190	164	53.42	21	40.285	153	7.54	9
11.3	14.875	278	38.04	72	26.614	169	21.20	8	52.026	181	53.63	15	40.132	170	7.45	4
21.3	14.597	283	38.76	22	26.445	172	21.12	0	51.845	186	53.78	6	39.962	173	7.41	2
31.3	14.314	277	38.98	26	26.273	166	21.12	6	51.659	180	53.84	3	39.789	168	7.43	5
r. 10.2	14.037	259	38.72	73	26.107	151	21.18	14	51.479	163	53.81	11	39.621	153	7.48	9
20.2	13.778	233	37.99	119	25.956	126	21.32	23	51.316	138	53.70	18	39.468	128	7.57	13
30.2	13.545	198	36.80	161	25.830	96	21.55	28	51.178	103	53.52	25	39.340	99	7.70	18
y 10.1	13.347	158	35.19	199	25.734	60	21.83	36	51.075	65	53.27	28	39.241	63	7.88	24
20.1	13.189	111	33.20	230	25.674	22	22.19	44	51.010	24	52.99	30	39.178	25	8.12	29
30.1	13.078	64	30.90	259	25.652	17	22.63	51	50.986	20	52.69	31	39.153	15	8.41	33
ne 9.1	13.014	14	28.31	279	25.669	57	23.14	56	51.006	62	52.38	30	39.168	55	8.74	39
19.0	13.000	37	25.52	293	25.726	95	23.70	61	51.068	105	52.08	28	39.223	92	9.13	42
29.0	13.037	86	22.59	297	25.821	131	24.31	64	51.173	142	51.80	27	39.315	130	9.55	45
ly 9.0	13.123	133	19.62	294	25.952	163	24.95	64	51.315	179	51.53	23	39.445	163	10.00	45
19.0	13.256	178	16.68	282	26.115	192	25.59	61	51.494	211	51.30	23	39.608	191	10.45	42
28.9	13.434	220	13.86	258	26.307	219	26.20	55	51.705	238	51.07	23	39.799	218	10.87	38
g. 7.9	13.654	256	11.28	228	26.526	240	26.75	46	51.943	263	50.84	25	40.017	241	11.25	30
17.9	13.910	287	9.00	188	26.766	259	27.21	33	52.206	282	50.59	26	40.258	260	11.55	18
27.8	14.197	315	7.12	141	27.025	274	27.54	15	52.488	300	50.33	30	40.518	275	11.73	5
pt. 6.8	14.512	335	5.71	87	27.299	286	27.69	1	52.788	313	50.03	35	40.793	288	11.78	10
16.8	14.847	350	4.84	29	27.585	295	27.68	22	53.101	322	49.68	39	41.081	298	11.68	27
26.8	15.197	357	4.55	31	27.880	301	27.46	42	53.423	328	49.29	43	41.379	305	11.41	43
t. 6.7	15.554	356	4.86	94	28.181	303	27.04	62	53.751	332	48.86	48	41.684	307	10.98	62
16.7	15.910	346	5.80	152	28.484	300	26.42	79	54.083	329	48.38	50	41.991	304	10.36	77
26.7	16.256	331	7.32	207	28.784	293	25.63	95	54.412	322	47.88	50	42.295	298	9.59	88
ov. 5.7	16.587	304	9.39	255	29.077	281	24.68	106	54.734	308	47.38	48	42.593	288	8.71	97
15.6	16.891	270	11.94	295	29.358	260	23.62	112	55.042	288	46.90	42	42.881	267	7.74	102
25.6	17.161	228	14.89	323	29.618	236	22.50	115	55.330	260	46.48	35	43.148	242	6.72	101
ec. 5.6	17.389	178	18.12	342	29.854	202	21.35	113	55.590	225	46.13	23	43.390	209	5.71	98
15.5	17.567	122	21.54	350	30.056	162	20.22	107	55.815	183	45.90	13	43.599	169	4.73	90
25.5	17.689	62	25.04	345	30.218	118	19.15	96	55.998	134	45.77	2	43.768	124	3.83	80
35.5	17.751		28.49		30.336		18.19		56.132		45.75		43.892		3.03	
n Place	13.382		21.57		24.445		24.51		49.590		51.95		37.896		10.03	
: δ, Tan δ	1.370		−0.937		1.015		+0.176		1.105		+0.471		1.026		+0.231	
α, Dψ α	+0.04		−0.01		+0.07		0.00		+0.07		+0.01		+0.07		0.00	
δ, Dε δ	−0.1		+1.0		−0.1		+1.0		−0.1		+1.0		−0.1		+1.0	

FOR THE UPPER TRANSIT AT .

FOR THE UPPER TRANSIT AT WASHINGTON.

[Wash]ington [Mea]n Time.	θ Geminorum. Mag. 3.6 Right Ascension.		Declination.		α Pictoris. Mag. 3.3 Right Ascension.		Declination.		τ Argus. Mag. 2.8 Right Ascension.		Declination.		15 Lyncis. Mag. 4.5 Right Ascension.		Declination.	
	h m 6 47		° ′ +34 3		h m 6 47		° ′ −61 50		h m 6 47		° ′ −50 30		h m 6 50		° ′ +58 31	
	s		″		s		″		s		″		s		″	
ı. 0.5	22.212	123	44.67	59	23.50	2	66.50	372	55.166	26	55.23	359	10.180	162	58.69	198
10.5	22.335	65	45.26	67	23.48	11	70.22	354	55.192	45	58.82	341	10.342	70	60.67	202
20.5	22.400	5	45.93	73	23.37	20	73.76	329	55.147	112	62.23	315	10.412	21	62.69	199
30.4	22.405	53	46.66	73	23.17	27	77.05	292	55.035	173	65.38	280	10.391	107	64.68	187
b. 9.4	22.352	102	47.39	68	22.90	34	79.97	252	54.862	228	68.18	239	10.284	185	66.55	165
19.4	22.250	144	48.07	60	22.56	40	82.49	204	54.634	273	70.57	194	10.099	250	68.20	139
r. 1.3	22.106	177	48.67	48	22.16	44	84.53	154	54.361	307	72.51	145	9.849	301	69.59	104
11.3	21.929	197	49.15	30	21.72	47	86.07	102	54.054	326	73.96	93	9.548	332	70.63	65
21.3	21.732	204	49.45	15	21.25	48	87.09	47	53.728	335	74.89	43	9.216	345	71.28	24
31.3	21.528	199	49.60	4	20.77	48	87.56	5	53.393	331	75.32	8	8.871	341	71.52	17
r. 10.2	21.329	183	49.56	21	20.29	45	87.51	58	53.062	314	75.24	59	8.530	316	71.35	57
20.2	21.146	156	49.35	37	19.84	43	86.93	109	52.748	289	74.65	108	8.214	279	70.78	94
30.2	20.990	122	48.98	52	19.41	38	85.84	157	52.459	253	73.57	152	7.935	228	69.84	128
y 10.2	20.868	81	48.46	62	19.03	32	84.27	200	52.206	212	72.05	195	7.707	167	68.56	157
20.1	20.787	36	47.84	73	18.71	26	82.27	238	51.994	162	70.10	229	7.540	99	66.99	179
30.1	20.751	10	47.11	77	18.45	20	79.89	272	51.832	109	67.81	261	7.441	28	65.20	197
ne 9.1	20.761	56	46.34	81	18.25	13	77.17	298	51.723	55	65.20	285	7.413	46	63.23	208
19.0	20.817	102	45.53	82	18.12	4	74.19	314	51.668	3	62.35	302	7.459	117	61.15	214
29.0	20.919	144	44.71	81	18.08	4	71.05	323	51.671	59	59.33	309	7.576	187	59.01	214
ly 9.0	21.063	183	43.90	79	18.12	11	67.82	322	51.730	115	56.24	307	7.763	251	56.87	209
19.0	21.246	220	43.11	76	18.23	18	64.60	312	51.845	167	53.17	298	8.014	310	54.78	201
28.9	21.466	251	42.35	74	18.41	25	61.48	292	52.012	217	50.19	277	8.324	363	52.77	189
ıg. 7.9	21.717	277	41.61	68	18.66	32	58.56	260	52.229	264	47.42	247	8.687	410	50.88	173
17.9	21.994	302	40.93	67	18.98	38	55.96	221	52.493	304	44.95	208	9.097	450	49.15	154
27.9	22.296	320	40.26	63	19.36	43	53.75	173	52.797	338	42.87	160	9.547	483	47.61	133
pt. 6.8	22.616	335	39.63	60	19.79	47	52.02	116	53.135	365	41.27	106	10.030	511	46.28	109
16.8	22.951	349	39.03	57	20.26	49	50.86	55	53.500	386	40.21	46	10.541	529	45.19	85
26.8	23.300	357	38.46	53	20.75	51	50.31	11	53.886	397	39.75	16	11.070	543	44.34	57
ct. 6.7	23.657	360	37.93	47	21.26	51	50.42	77	54.283	398	39.91	80	11.613	549	43.77	28
16.7	24.017	360	37.46	40	21.77	49	51.19	142	54.681	392	40.71	145	12.162	545	43.49	2
26.7	24.377	352	37.06	31	22.26	47	52.61	202	55.073	373	42.16	202	12.707	532	43.51	33
ov. 5.7	24.729	340	36.75	20	22.73	43	54.63	258	55.446	344	44.18	254	13.239	508	43.84	66
15.6	25.069	318	36.55	7	23.16	36	57.21	304	55.790	306	46.72	299	13.747	473	44.50	95
25.6	25.387	290	36.48	7	23.52	30	60.25	340	56.096	257	49.71	331	14.220	424	45.45	126
ec. 5.6	25.677	252	36.55	23	23.82	22	63.65	364	56.353	200	53.02	356	14.644	364	46.71	152
15.6	25.929	206	36.78	37	24.04	13	67.29	377	56.553	136	56.58	366	15.008	291	48.23	175
25.5	26.135	153	37.15	51	24.17	4	71.06	378	56.689	69	60.24	366	15.299	210	49.98	191
35.5	26.288		37.66		24.21		74.84		56.758		63.90		15.509		51.89	
[Mea]n Place	19.245		45.02		20.476		67.91		52.585		56.32		5.803		59.14	
[Sec] δ, Tan δ	1.207		+0.676		2.120		−1.869		1.573		−1.214		1.916		+1.634	
[dα], D_{ω} α	+0.08		+0.01		+0.01		−0.03		+0.03		−0.02		+0.10		+0.02	
[d]δ, D_{ω} δ	−0.1		+1.0		−0.1		+1.0		−0.1		+1.0		−0.1		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	θ Canis Majoris. Mag. 4.2 Right Ascension.		θ Canis Majoris. Mag. 4.2 Declination.		ϵ Canis Majoris. Mag. 1.6 Right Ascension.		ϵ Canis Majoris. Mag. 1.6 Declination.		ζ Geminorum. Var. 3.7–4.3 Right Ascension.		ζ Geminorum. Var. 3.7–4.3 Declination.		o^2 Canis M… Mag. … Right Ascension.	
	h m		° ′		h m		° ′		h m		° ′		h m	
	6 50		−11 55		6 55		−28 51		6 59		+20 41		6 59	
	s		″		s		″		s		″		s	
Jan. 0.5	22.348	86	61.18	220	24.117	75	29.51	299	13.884	123	33.99	28	35.801	85
10.5	22.434	37	63.38	202	24.192	20	32.50	283	14.007	71	33.71	16	35.886	33
20.5	22.471	12	65.40	182	24.212	33	35.33	257	14.078	18	33.55	4	35.919	20
30.4	22.459	58	67.22	157	24.179	83	37.90	229	14.096	34	33.51	5	35.899	68
Feb. 9.4	22.401	100	68.79	131	24.096	127	40.19	193	14.062	80	33.56	12	35.831	112
19.4	22.301	134	70.10	102	23.969	164	42.12	156	13.982	120	33.68	15	35.719	146
Mar. 1.3	22.167	160	71.12	73	23.805	192	43.68	116	13.862	149	33.83	17	35.573	177
11.3	22.007	176	71.85	45	23.613	210	44.84	76	13.713	170	34.00	15	35.396	193
21.3	21.831	183	72.30	15	23.403	217	45.60	33	13.543	178	34.15	12	35.203	203
31.3	21.648	178	72.45	12	23.186	214	45.93	7	13.365	175	34.27	9	35.000	200
Apr. 10.2	21.470	165	72.33	39	22.972	202	45.86	46	13.190	162	34.36	3	34.800	189
20.2	21.305	145	71.94	66	22.770	182	45.40	85	13.028	141	34.39	0	34.611	168
30.2	21.160	117	71.28	90	22.588	153	44.55	122	12.887	111	34.39	3	34.443	143
May 10.2	21.043	85	70.38	114	22.435	119	43.33	155	12.776	77	34.36	6	34.300	110
20.1	20.958	50	69.24	133	22.316	83	41.78	184	12.699	38	34.30	7	34.190	74
30.1	20.908	11	67.91	150	22.233	43	39.94	210	12.661	0	34.23	7	34.116	36
June 9.1	20.897	27	66.41	165	22.190	2	37.84	228	12.661	41	34.16	7	34.080	3
19.0	20.924	64	64.76	173	22.188	40	35.56	242	12.702	81	34.09	6	34.083	43
29.0	20.988	99	63.03	178	22.228	80	33.14	249	12.783	119	34.03	6	34.126	81
July 9.0	21.087	134	61.25	176	22.308	119	30.65	248	12.902	153	33.97	6	34.207	118
19.0	21.221	165	59.49	168	22.427	154	28.17	239	13.055	184	33.91	8	34.325	153
28.9	21.386	192	57.81	155	22.581	187	25.78	222	13.239	213	33.83	10	34.478	184
Aug. 7.9	21.578	217	56.26	136	22.768	219	23.56	197	13.452	238	33.73	15	34.662	212
17.9	21.795	239	54.90	109	22.987	245	21.59	165	13.690	260	33.58	22	34.874	236
27.9	22.034	257	53.81	79	23.232	269	19.94	124	13.950	278	33.36	29	35.110	260
Sept. 6.8	22.291	272	53.02	42	23.501	286	18.70	79	14.228	293	33.07	39	35.370	278
16.8	22.563	284	52.60	5	23.787	303	17.91	29	14.521	307	32.68	48	35.648	291
26.8	22.847	292	52.55	39	24.090	312	17.62	24	14.828	316	32.20	57	35.939	304
Oct. 6.7	23.139	296	52.94	76	24.402	316	17.86	78	15.144	322	31.63	67	36.243	307
16.7	23.435	295	53.70	117	24.718	315	18.64	130	15.466	323	30.96	74	36.550	307
26.7	23.730	288	54.87	153	25.033	306	19.94	179	15.789	319	30.22	77	36.857	301
Nov. 5.7	24.018	276	56.40	182	25.339	291	21.73	222	16.108	309	29.45	79	37.158	287
15.6	24.294	257	58.22	207	25.630	267	23.95	257	16.417	293	28.66	77	37.445	266
25.6	24.551	231	60.29	224	25.897	238	26.52	283	16.710	268	27.89	70	37.711	239
Dec. 5.6	24.782	197	62.53	232	26.135	199	29.35	302	16.978	236	27.19	61	37.950	203
15.6	24.979	157	64.85	233	26.334	153	32.37	308	17.214	198	26.58	50	38.153	160
25.5	25.136	113	67.18	226	26.487	104	35.45	305	17.412	150	26.08	37	38.313	114
35.5	25.249		69.44		26.591		38.50		17.562		25.71		38.427	
Mean Place	20.048		61.24		21.817		30.10		11.248		35.05		33.520	
Sec δ, Tan δ	1.022		−0.211		1.142		−0.551		1.069		+0.378		1.092	
$D_\psi \alpha$, $D_\omega \alpha$	+0.06		0.00		+0.05		−0.01		+0.07		+0.01		+0.05	
$D_\psi \delta$, $D_\omega \delta$	−0.1		+1.0		−0.1		+1.0		−0.1		+1.0		−0.1	

FOR THE UPPER TRANSIT AT WASHINGTON.

...ton ...Time.	γ Canis Majoris. Mag. 4.1 Right Ascension.		Declination.		δ Canis Majoris. Mag. 2.0 Right Ascension.		Declination.	
	h m 7 0		° ′ −15 30		h m 7 5		° ′ −26 15	
	s		″		s		″	
ı. 0.5	2.506		35.19		3.215		37.80	
10.5	2.598	92	37.60	241	3.303	88	40.72	202
20.5	2.641	43	39.85	225	3.338	35	43.48	276
30.4	2.634	7	41.87	202	3.320	18	46.01	253
b. 9.4	2.580	54	43.65	178	3.252	68	48.25	224
19.4	2.483	97	45.14	149	3.139	113	50.17	192
r. 1.4	2.350	133	46.32	118	2.988	151	51.73	156
11.3	2.189	161	47.20	88	2.809	179	52.91	118
21.3	2.011	178	47.76	56	2.611	198	53.70	79
31.3	1.826	185	48.00	24	2.404	207	54.09	39
r. 10.2	1.642	184	47.94	6	2.197	207	54.10	1
20.2	1.471	171	47.56	38	2.002	195	53.72	38
30.2	1.318	153	46.89	67	1.825	177	52.97	75
y 10.2	1.192	126	45.96	93	1.674	151	51.87	110
20.1	1.096	96	44.77	119	1.556	118	50.46	141
30.1	1.036	60	43.36	141	1.473	83	48.74	172
ne 9.1	1.013	23	41.75	161	1.427	46	46.79	195
19.1	1.028	15	39.99	176	1.421	6	44.64	215
29.0	1.079	51	38.13	186	1.455	34	42.35	229
ly 9.0	1.167	88	36.21	192	1.529	74	40.00	235
19.0	1.290	123	34.30	191	1.640	111	37.64	236
28.9	1.445	155	32.46	184	1.785	145	35.35	229
g. 7.9	1.628	183	30.77	169	1.963	178	33.22	213
17.9	1.838	210	29.27	150	2.172	209	31.31	191
27.9	2.071	233	28.05	122	2.407	235	29.72	159
pt. 6.8	2.325	254	27.15	90	2.666	259	28.50	122
16.8	2.595	270	26.63	52	2.945	279	27.72	78
26.8	2.878	283	26.52	11	3.239	294	27.42	30
ct. 6.8	3.172	294	26.84	32	3.545	306	27.63	21
16.7	3.471	299	27.61	77	3.857	312	28.36	73
26.7	3.770	299	28.80	119	4.170	313	29.60	124
ov. 5.7	4.065	295	30.38	158	4.476	306	31.31	171
15.6	4.348	283	32.29	191	4.770	294	33.44	213
25.6	4.612	264	34.48	219	5.044	274	35.93	249
ec. 5.6	4.850	238	36.86	238	5.288	244	38.67	274
15.6	5.055	205	39.35	249	5.496	208	41.58	291
25.5	5.220	165	41.87	252	5.661	165	44.57	299
35.5	5.340	120	44.35	248	5.778	117	47.55	298
n Place	0.220		35.28		0.931		38.37	
δ, Tan δ	1.038		−0.277		1.115		−0.493	
α, D α	+0.05		0.00		+0.05		−0.01	
δ, D δ	−0.1		+1.0		−0.1		+1.0	

...ton ...Time.	63 Aurigæ. Mag. 5.1 Right Ascension.		Declination.		51 Geminorum. Mag. 5.3 Right Ascension.		Declination.	
	h m 7 5		° ′ +39 27		h m 7 8		° ′ +16 17	
	s		″		s		″	
ı. 0.5	60.139		23.73		38.969		61.50	
10.5	60.290	151	24.60	87	39.097	128	60.90	60
20.5	60.378	88	25.58	98	39.175	78	60.45	45
30.4	60.403	25	26.62	104	39.201	26	60.13	32
b. 9.4	60.365	38	27.67	105	39.176	25	59.95	18
19.4	60.271	94	28.68	101	39.105	71	59.87	8
r. 1.4	60.128	143	29.57	89	38.994	111	59.87	0
11.3	59.947	181	30.30	73	38.854	140	59.92	5
21.3	59.740	207	30.84	54	38.692	162	60.01	9
31.3	59.522	218	31.15	31	38.520	172	60.12	11
r. 10.2	59.305	217	31.24	9	38.349	171	60.23	11
20.2	59.102	203	31.08	16	38.190	159	60.35	12
30.2	58.923	179	30.70	38	38.049	141	60.46	11
y 10.2	58.776	147	30.12	58	37.936	113	60.57	11
20.1	58.670	106	29.36	76	37.855	81	60.70	13
30.1	58.609	61	28.46	90	37.808	47	60.83	13
ne 9.1	58.596	13	27.44	102	37.802	6	60.97	14
19.1	58.632	36	26.34	110	37.834	32	61.13	16
29.0	58.715	83	25.19	115	37.903	69	61.30	17
ly 9.0	58.844	129	24.01	118	38.009	106	61.47	17
19.0	59.016	172	22.85	116	38.148	139	61.63	16
28.9	59.227	211	21.70	115	38.319	171	61.77	14
g. 7.9	59.473	246	20.57	113	38.518	199	61.86	9
17.9	59.750	277	19.48	109	38.741	223	61.88	2
27.9	60.055	305	18.45	103	38.987	246	61.80	8
pt. 6.8	60.384	329	17.48	97	39.253	266	61.60	20
16.8	60.733	349	16.58	90	39.534	281	61.28	32
26.8	61.097	364	15.75	83	39.829	295	60.82	46
ct. 6.8	61.474	377	15.02	73	40.136	307	60.21	61
16.7	61.859	385	14.39	63	40.449	313	59.46	75
26.7	62.246	387	13.88	51	40.765	316	58.61	85
ov. 5.7	62.629	383	13.52	36	41.079	314	57.67	94
15.6	63.002	373	13.34	18	41.384	305	56.67	100
25.6	63.354	352	13.34	0	41.675	291	55.66	101
ec. 5.6	63.678	324	13.55	21	41.942	267	54.68	98
15.6	63.964	286	13.96	41	42.180	238	53.77	91
25.5	64.202	238	14.55	59	42.380	200	52.96	81
35.5	64.386	184	15.33	78	42.535	155	52.30	66
n Place	56.990		25.69		36.417		62.98	
δ, Tan δ	1.295		+0.823		1.042		+0.292	
α, D α	+0.08		+0.02		+0.08		+0.01	
δ, D δ	−0.1		+1.0		−0.1		+1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	γ^2 Volantis. Mag. 3.9 Right Ascension.		Declination.		λ Geminorum. Mag. 3.6 Right Ascension.		Declination.		π Argus. Mag. 2.7 Right Ascension.		Declination.		δ Gemi[norum] Mag. Right Ascension.	
	h m		° ′		h m		° ′		h m		° ′		h m	
	7 9		−70 21		7 13		+16 41		7 14		−36 56		7 15	
	s		″		s		″		s		″		s	
Jan. 0.5	30.97		48.87		22.027		26.05		15.015		51.65		12.738	
10.5	30.96	1	52.69	382	22.161	134	25.47	58	15.102	87	54.99	334	12.878	140
20.5	30.83	13	56.40	371	22.243	82	25.03	44	15.130	28	58.19	320	12.966	88
30.4	30.56	27	59.89	349	22.273	30	24.73	30	15.100	30	61.16	297	13.000	34
Feb. 9.4	30.19	37	63.08	319	22.252	21	24.57	16	15.016	84	63.84	268	12.981	19
19.4	29.72	47	65.91	283	22.184	68	24.51	6	14.882	134	66.18	234	12.913	68
Mar. 1.4	29.17	55	68.30	239	22.076	108	24.53	2	14.706	176	68.11	193	12.803	110
11.3	28.55	62	70.21	191	21.937	139	24.60	7	14.498	208	69.62	151	12.661	142
21.3	27.89	66	71.60	139	21.776	161	24.71	11	14.268	230	70.69	107	12.495	166
31.3	27.20	69	72.47	87	21.605	171	24.84	13	14.026	242	71.30	61	12.319	176
Apr. 10.3	26.51	69	72.80	33	21.434	171	24.96	12	13.783	243	71.45	15	12.143	176
20.2	25.84	67	72.61	19	21.274	160	25.08	12	13.549	234	71.16	29	11.977	166
30.2	25.20	64	71.90	71	21.131	143	25.20	12	13.335	214	70.43	73	11.829	148
May 10.2	24.60	60	70.68	122	21.015	116	25.31	11	13.145	190	69.28	115	11.708	121
20.1	24.07	53	68.99	169	20.932	83	25.42	11	12.988	157	67.76	152	11.619	89
30.1	23.61	46	66.87	212	20.883	49	25.54	12	12.868	120	65.90	186	11.568	51
June 9.1	23.24	37	64.39	248	20.872	11	25.66	12	12.789	79	63.72	218	11.556	12
19.1	22.97	27	61.61	278	20.899	27	25.79	13	12.752	37	61.31	241	11.583	27
29.0	22.81	16	58.58	303	20.964	65	25.94	15	12.758	6	58.71	260	11.649	66
July 9.0	22.75	6	55.43	315	21.066	102	26.07	13	12.808	50	56.02	269	11.753	104
19.0	22.78	3	52.22	321	21.200	134	26.20	13	12.900	92	53.30	272	11.891	138
29.0	22.94	16	49.04	318	21.367	167	26.30	10	13.034	134	50.65	265	12.062	171
Aug. 7.9	23.21	27	46.03	301	21.561	194	26.35	5	13.206	172	48.15	250	12.263	201
17.9	23.57	36	43.26	277	21.782	221	26.32	3	13.415	209	45.88	227	12.489	226
27.9	24.02	45	40.84	242	22.024	242	26.20	12	13.655	240	43.94	194	12.740	251
Sept. 6.8	24.55	53	38.86	198	22.287	263	25.96	24	13.926	271	42.41	153	13.010	270
16.8	25.15	60	37.42	144	22.566	279	25.60	36	14.222	296	41.35	106	13.299	289
26.8	25.80	65	36.56	86	22.860	294	25.10	50	14.537	315	40.83	52	13.603	304
Oct. 6.8	26.48	68	36.33	23	23.167	307	24.47	63	14.867	330	40.88	5	13.919	316
16.7	27.18	70	36.78	45	23.480	313	23.69	78	15.205	338	41.50	62	14.243	324
26.7	27.86	68	37.89	111	23.797	317	22.81	88	15.545	340	42.70	120	14.571	328
Nov. 5.7	28.51	65	39.63	174	24.114	317	21.85	96	15.879	334	44.45	175	14.899	328
15.7	29.11	60	41.97	234	24.422	308	20.84	101	16.198	319	46.69	224	15.219	320
25.6	29.63	52	44.82	285	24.717	295	19.82	102	16.493	295	49.36	267	15.524	305
Dec. 5.6	30.06	43	48.07	325	24.989	272	18.83	99	16.755	262	52.36	300	15.808	284
15.6	30.37	31	51.65	358	25.231	242	17.92	91	16.977	222	55.58	322	16.060	252
25.5	30.57	20	55.41	376	25.436	205	17.11	81	17.151	174	58.94	336	16.274	214
35.5	30.64	7	59.24	383	25.596	160	16.45	66	17.272	121	62.31	337	16.443	169
Mean Place	27.280		51.69		19.471		27.81		12.680		52.95		10.085	
Sec δ, Tan δ	2.976		−2.803		1.044		+0.300		1.251		−0.752		1.080	
$D_\psi a$, $D_\omega a$	−0.01		−0.06		+0.07		+0.01		+0.04		−0.02		+0.07	
$D_\psi \delta$, $D_\omega \delta$	−0.1		+1.0		−0.1		+0.9		−0.1		+0.9		−0.1	

FOR THE UPPER TRANSIT AT WASHINGTON.

hington Time.	δ Volantis. Mag. 4.0 Right Ascension.		Declination.		ι Geminorum. Mag. 3.9 Right Ascension.		Declination.		η Canis Majoris. Mag. 2.4 Right Ascension.		Declination.		Groombridge 1308. Mag. 5.8 Right Ascension.		Declination.	
	h m 7 16		° ′ −67 48		h m 7 20		° ′ +27 57		h m 7 20		° ′ −29 8		h m 7 22		° ′ +68 37	
	s		″		s		″		s		″		s		″	
ı. 0.5	56.36		16.25		37.215		48.05		51.045		24.72		21.40		68.95	
		2		384		152		10		103		306		28		237
10.5	56.38		20.09		37.367		48.15		51.148		27.78		21.68		71.32	
		9		375		98		26		48		295		14		248
20.5	56.29		23.84		37.465		48.41		51.196		30.73		21.82		73.80	
		20		355		39		37		6		273		1		249
30.4	56.09		27.39		37.504		48.78		51.190		33.46		21.83		76.29	
		30		327		15		46		58		245		10		240
b. 9.4	55.79		30.66		37.489		49.24		51.132		35.91		21.73		78.69	
		39		290		67		50		105		212		23		220
19.4	55.40		33.56		37.422		49.74		51.027		38.03		21.50		80.89	
		48		247		111		51		144		176		32		193
r. 1.4	54.92		36.03		37.311		50.25		50.883		39.79		21.18		82.82	
		53		200		146		47		178		138		41		156
11.3	54.39		38.03		37.165		50.72		50.705		41.17		20.77		84.38	
		57		150		172		40		199		98		47		114
21.3	53.82		39.53		36.993		51.12		50.506		42.15		20.30		85.52	
		60		98		184		30		211		56		51		66
31.3	53.22		40.51		36.809		51.42		50.295		42.71		19.79		86.18	
		60		43		186		17		211		17		51		17
r. 10.3	52.62		40.94		36.623		51.59		50.084		42.88		19.28		86.35	
		59		10		177		6		205		26		49		32
20.2	52.03		40.84		36.446		51.65		49.879		42.62		18.79		86.03	
		57		62		157		6		189		64		46		80
30.2	51.46		40.22		36.289		51.59		49.690		41.98		18.33		85.23	
		52		113		130		17		164		102		41		123
y 10.2	50.94		39.09		36.159		51.42		49.526		40.96		17.92		84.00	
		46		161		98		29		136		134		33		163
20.1	50.48		37.48		36.061		51.13		49.390		39.62		17.59		82.37	
		41		204		59		36		100		167		25		197
30.1	50.07		35.44		36.002		50.77		49.290		37.95		17.34		80.40	
		33		243		19		42		64		193		15		223
ne 9.1	49.74		33.01		35.983		50.35		49.226		36.02		17.19		78.17	
		24		273		21		48		24		216		6		245
19.1	49.50		30.28		36.004		49.87		49.202		33.86		17.13		75.72	
		15		298		63		51		15		230		6		259
29.0	49.35		27.30		36.067		49.36		49.217		31.56		17.19		73.13	
		6		313		102		54		54		242		14		266
ly 9.0	49.29		24.17		36.169		48.82		49.271		29.14		17.33		70.47	
		4		320		139		56		92		244		24		268
19.0	49.33		20.97		36.308		48.26		49.363		26.70		17.57		67.79	
		13		318		173		59		130		238		33		263
29.0	49.46		17.79		36.481		47.67		49.493		24.32		17.90		65.16	
		23		303		205		60		164		223		42		253
g. 7.9	49.69		14.76		36.686		47.07		49.657		22.09		18.32		62.63	
		31		281		231		63		196		202		49		239
17.9	50.00		11.95		36.917		46.44		49.853		20.07		18.81		60.24	
		40		246		258		66		226		173		56		219
27.9	50.40		9.49		37.175		45.78		50.079		18.34		19.37		58.05	
		48		202		280		70		252		135		61		196
pt. 6.8	50.88		7.47		37.455		45.08		50.331		16.99		19.98		56.09	
		53		151		299		75		274		92		67		169
16.8	51.41		5.96		37.754		44.33		50.605		16.07		20.65		54.40	
		58		92		315		77		295		44		71		140
26.8	51.99		5.04		38.069		43.56		50.900		15.63		21.36		53.00	
		61		30		329		80		310		9		74		106
t. 6.8	52.60		4.74		38.398		42.76		51.210		15.72		22.10		51.94	
		63		37		338		81		318		63		75		69
16.7	53.23		5.11		38.736		41.95		51.528		16.35		22.85		51.25	
		62		105		344		81		321		115		76		30
26.7	53.85		6.16		39.080		41.14		51.849		17.50		23.61		50.95	
		60		167		344		77		317		166		76		9
ov. 5.7	54.45		7.83		39.424		40.37		52.166		19.16		24.37		51.04	
		55		228		337		70		307		212		73		52
15.7	55.00		10.11		39.761		39.67		52.473		21.28		25.10		51.56	
		48		280		322		61		288		250		69		92
25.6	55.48		12.91		40.083		39.06		52.761		23.78		25.79		52.48	
		42		323		299		49		260		279		63		132
ec. 5.6	55.90		16.14		40.382		38.57		53.021		26.57		26.42		53.80	
		31		356		268		33		224		301		55		169
15.6	56.21		19.70		40.650		38.24		53.245		29.58		26.97		55.49	
		22		376		229		16		182		311		45		201
25.5	56.43		23.46		40.879		38.08		53.427		32.69		27.42		57.50	
		10		384		181		0		133		312		34		224
35.5	56.53		27.30		41.060		38.08		53.560		35.81		27.76		59.74	
n Place	52.958		19.34		34.438		50.80		48.770		25.61		15.511		72.89	
δ, Tan δ	2.647		−2.451		1.132		+0.531		1.145		−0.558		2.745		+2.556	
α, D α	0.00		−0.05		+0.07		+0.01		+0.05		−0.01		+0.13		+0.08	
δ, D δ	−0.1		+0.9		−0.1		+0.9		−0.1		+0.9		−0.1		+0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	β Canis Minoris. Mag. 3.1 Right Ascension.		β Canis Minoris. Declination.		ρ Geminorum. Mag. 4.2 Right Ascension.		ρ Geminorum. Declination.		σ Argus. Mag. 3.3 Right Ascension.		σ Argus. Declination.		α² Geminorum (Castor.) Mag. 2.0 Right Ascension.		D
	h m		° ′		h m		° ′		h m		° ′		h m		
	7 22		+ 8 27		7 23		+31 56		7 26		−43 7		7 29		
	s		″		s		″		s		″		s		
Jan. 0.5	41.479	136	25.14	112	49.393	162	59.75	35	38.187	96	56.08	354	21.275	168	
10.5	41.615	85	24.02	97	49.555	104	60.10	50	38.283	33	59.62	343	21.443	110	
20.5	41.700	35	23.05	80	49.659	44	60.60	61	38.316	29	63.05	324	21.553	49	
30.5	41.735	15	22.25	63	49.703	12	61.21	70	38.287	90	66.29	294	21.602	8	
Feb. 9.4	41.720	61	21.62	47	49.691	67	61.91	72	38.197	145	69.23	260	21.594	62	
19.4	41.659	99	21.15	33	49.624	114	62.63	68	38.052	189	71.83	220	21.532	110	
Mar. 1.4	41.560	132	20.82	18	49.510	150	63.31	62	37.863	228	74.03	176	21.422	147	
11.3	41.428	153	20.64	8	49.360	178	63.93	52	37.635	254	75.79	130	21.275	176	
21.3	41.275	165	20.56	3	49.182	191	64.45	37	37.381	268	77.09	83	21.099	190	
31.3	41.110	165	20.59	11	48.991	194	64.82	21	37.113	271	77.92	34	20.909	195	
Apr. 10.3	40.945	158	20.70	18	48.797	185	65.03	6	36.842	265	78.26	14	20.714	187	
20.2	40.787	142	20.88	27	48.612	165	65.09	10	36.577	248	78.12	61	20.527	169	
30.2	40.645	117	21.15	33	48.447	139	64.99	27	36.329	224	77.51	106	20.358	142	
May 10.2	40.528	89	21.48	40	48.308	104	64.72	40	36.105	193	76.45	148	20.216	108	
20.2	40.439	55	21.88	45	48.204	65	64.32	51	35.912	155	74.97	185	20.108	71	
30.1	40.384	19	22.33	51	48.139	24	63.81	60	35.757	113	73.12	218	20.037	29	
June 9.1	40.365	16	22.84	55	48.115	19	63.21	69	35.644	68	70.94	248	20.008	12	
19.1	40.381	51	23.39	59	48.134	61	62.52	73	35.576	21	68.46	268	20.020	55	
29.0	40.432	87	23.98	59	48.195	101	61.79	77	35.555	25	65.78	281	20.075	94	
July 9.0	40.519	120	24.57	58	48.296	140	61.02	80	35.580	71	62.97	286	20.169	134	
19.0	40.639	149	25.15	53	48.436	177	60.22	82	35.651	118	60.11	283	20.303	170	
29.0	40.788	178	25.68	46	48.613	209	59.40	83	35.769	162	57.28	270	20.473	203	
Aug. 7.9	40.966	203	26.14	36	48.822	238	58.57	85	35.931	203	54.58	246	20.676	232	
17.9	41.169	226	26.50	20	49.060	266	57.72	85	36.134	242	52.12	216	20.908	260	
27.9	41.395	246	26.70	4	49.326	288	56.87	86	36.376	276	49.96	175	21.168	283	
Sept. 6.9	41.641	265	26.74	16	49.614	309	56.01	87	36.652	307	48.21	127	21.451	306	
16.8	41.906	280	26.58	37	49.923	326	55.14	87	36.959	331	46.94	73	21.757	323	
26.8	42.186	293	26.21	59	50.249	341	54.27	86	37.290	351	46.21	15	22.080	339	
Oct. 6.8	42.479	303	25.62	81	50.590	352	53.41	84	37.641	362	46.06	48	22.419	351	
16.7	42.782	307	24.81	100	50.942	358	52.57	78	38.003	366	46.54	108	22.770	357	
26.7	43.089	307	23.81	118	51.300	357	51.79	70	38.369	361	47.62	166	23.127	359	
Nov. 5.7	43.396	301	22.63	130	51.657	350	51.09	60	38.730	345	49.28	221	23.486	352	
15.7	43.697	289	21.33	139	52.007	337	50.49	47	39.075	322	51.49	268	23.838	339	
25.6	43.986	267	19.94	142	52.344	313	50.02	30	39.397	286	54.17	305	24.177	317	
Dec. 5.6	44.253	240	18.52	139	52.657	282	49.72	13	39.683	242	57.22	333	24.494	286	
15.6	44.493	204	17.13	132	52.939	240	49.59	5	39.925	190	60.55	351	24.780	245	
25.6	44.697	161	15.81	121	53.179	190	49.64	25	40.115	133	64.06	356	25.025	196	
35.5	44.858		14.60		53.369		49.89		40.248		67.62		25.221		
Mean Place	39.049		26.92		46.515		62.93		35.800		58.09		18.402		19
Sec δ, Tan δ	1.011		+0.149		1.178		+0.624		1.370		−0.937		1.180		+0
$D_\psi \alpha$, $D_\omega \alpha$	+0.07		0.00		+0.08		+0.01		+0.05		−0.02		+0.08		
$D_\psi \delta$, $D_\omega \delta$	−0.1		+0.9		−0.1		+0.9		−0.1		+0.9		−0.2		

FOR THE UPPER TRANSIT AT WASHINGTON.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	β Geminorum. (*Pollux.*) Mag. 1.2 Right Ascension.		β Geminorum. Declination.		4 Puppis. Mag. 5.1 Right Ascension.		4 Puppis. Declination.		ξ Argus. Mag. 3.5 Right Ascension.		ξ Argus. Declination.		φ Gemin Mag. Right Ascension.	
	h m		° ′		h m		° ′		h m		° ′		h m	
	7 40		+28 13		7 42		−14 21		7 45		−24 38		7 48	
	s		″		s		″		s		″		s	
Jan. 0.5	17.122	172	35.45	4	9.801	136	40.95	247	50.435	135	61.87	295	27.940	181
10.5	17.294	118	35.49	24	9.937	87	43.42	234	50.570	82	64.82	284	28.121	127
20.5	17.412	61	35.73	37	10.024	37	45.76	213	50.652	28	67.66	265	28.248	70
30.5	17.473	4	36.10	48	10.061	14	47.89	191	50.680	24	70.31	241	28.318	13
Feb. 9.4	17.477	50	36.58	56	10.047	61	49.80	163	50.656	72	72.72	210	28.331	40
19.4	17.427	98	37.14	58	9.986	100	51.43	136	50.584	114	74.82	178	28.291	87
Mar. 1.4	17.329	135	37.72	56	9.886	134	52.79	104	50.470	148	76.60	143	28.204	126
11.4	17.194	164	38.28	50	9.752	158	53.83	74	50.322	174	78.03	105	28.078	156
21.3	17.030	180	38.78	42	9.594	171	54.57	45	50.148	189	79.08	68	27.922	174
31.3	16.850	185	39.20	29	9.423	176	55.02	14	49.959	195	79.76	31	27.748	180
Apr. 10.3	16.665	180	39.49	16	9.247	172	55.16	15	49.764	191	80.07	7	27.568	176
20.2	16.485	164	39.65	4	9.075	158	55.01	42	49.573	179	80.00	42	27.392	162
30.2	16.321	141	39.69	9	8.917	140	54.59	70	49.394	159	79.58	77	27.230	141
May 10.2	16.180	110	39.60	21	8.777	113	53.89	94	49.235	135	78.81	110	27.089	112
20.2	16.070	75	39.39	32	8.664	84	52.95	118	49.100	104	77.71	138	26.977	78
30.1	15.995	37	39.07	40	8.580	53	51.77	136	48.996	72	76.33	166	26.899	43
June 9.1	15.958	1	38.67	47	8.527	17	50.41	152	48.924	36	74.67	187	26.856	4
19.1	15.959	42	38.20	54	8.510	17	48.89	166	48.888	1	72.80	203	26.852	35
29.1	16.001	81	37.66	59	8.527	50	47.23	172	48.887	36	70.77	215	26.887	73
July 9.0	16.082	117	37.07	64	8.577	85	45.51	175	48.923	72	68.62	219	26.960	109
19.0	16.199	152	36.43	67	8.662	117	43.76	170	48.995	107	66.43	216	27.069	142
29.0	16.351	183	35.76	73	8.779	146	42.06	159	49.102	140	64.27	205	27.211	175
Aug. 7.9	16.534	213	35.03	75	8.925	176	40.47	143	49.242	172	62.22	188	27.386	204
17.9	16.747	240	34.28	80	9.101	202	39.04	120	49.414	202	60.34	162	27.590	231
27.9	16.987	265	33.48	82	9.303	226	37.84	92	49.616	228	58.72	129	27.821	257
Sept. 6.9	17.252	285	32.63	89	9.529	249	36.92	56	49.844	255	57.43	90	28.078	278
16.8	17.537	306	31.74	93	9.778	268	36.36	18	50.099	275	56.53	46	28.356	300
26.8	17.843	322	30.81	96	10.046	284	36.18	24	50.374	294	56.07	3	28.656	316
Oct. 6.8	18.165	335	29.85	98	10.330	296	36.42	67	50.668	309	56.10	53	28.972	331
16.8	18.500	343	28.87	97	10.626	305	37.09	108	50.977	316	56.63	104	29.303	340
26.7	18.843	347	27.90	94	10.931	307	38.17	148	51.293	318	57.67	151	29.643	345
Nov. 5.7	19.190	344	26.96	86	11.238	301	39.65	182	51.611	313	59.18	195	29.988	344
15.7	19.534	333	26.10	75	11.539	290	41.47	212	51.924	299	61.13	232	30.332	334
25.6	19.867	313	25.35	61	11.829	270	43.59	234	52.223	277	63.45	263	30.666	316
Dec. 5.6	20.180	284	24.74	45	12.099	242	45.93	248	52.500	246	66.08	283	30.982	289
15.6	20.464	246	24.29	26	12.341	205	48.41	253	52.746	208	68.91	295	31.271	252
25.6	20.710	201	24.03	7	12.546	163	50.94	253	52.954	162	71.86	297	31.523	208
35.5	20.911		23.96		12.709		53.47		53.116		74.83		31.731	
Mean Place	14.369		39.63		7.563		40.59		48.212		62.57		25.235	
Sec δ, Tan δ	1.135		+0.537		1.032		−0.256		1.100		−0.459		1.122	
$D_\psi \alpha$, $D_\omega \alpha$	+0.07		+0.02		+0.05		−0.01		+0.05		−0.01		+0.07	
$D_\psi \delta$, $D_\omega \delta$	−0.2		+0.9		−0.2		+0.9		−0.2		+0.9		−0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

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FOR THE UPPER TRANSIT AT .

99396°—1917——25

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	β Cancri. Mag. 3.8 Right Ascension.		β Cancri. Declination.		31 Lyncis. Mag. 4.4 Right Ascension.		31 Lyncis. Declination.		d^1 Cancri. Mag. 5.9 Right Ascension.		d^1 Cancri. Declination.		ε Argus. Mag. 1.7 Right Ascension.		ε Argus. Declination.
	h m		° ′		h m		° ′		h m		° ′		h m		°
	8 12		+ 9 26		8 17		+43 26		8 18		+18 35		8 20		−
	s		″		s		″		s		″		s		″
Jan. 0.6	3.269	183	27.87	122	12.810	245	71.30	80	39.281	200	52.67	70	51.344	182	26.
10.5	3.452	135	26.65	105	13.055	181	72.10	103	39.481	149	51.97	50	51.526	97	30.
20.5	3.587	83	25.60	87	13.236	114	73.13	123	39.630	96	51.47	29	51.623	10	33.
30.5	3.670	32	24.73	64	13.350	44	74.36	135	39.726	42	51.18	11	51.633	74	37.
Feb. 9.5	3.702	17	24.09	46	13.394	21	75.71	142	39.768	9	51.07	6	51.559	154	41.
19.4	3.685	62	23.63	29	13.373	83	77.13	140	39.759	57	51.13	18	51.405	224	44.
Mar. 1.4	3.623	99	23.34	14	13.290	136	78.53	132	39.702	96	51.31	29	51.181	284	47.
11.4	3.524	128	23.20	2	13.154	177	79.85	115	39.606	129	51.60	34	50.897	330	50.
21.4	3.396	147	23.18	9	12.977	205	81.00	95	39.477	148	51.94	36	50.567	366	52.
31.3	3.249	156	23.27	18	12.772	221	81.95	70	39.329	160	52.30	36	50.201	386	54.
Apr. 10.3	3.093	156	23.45	25	12.551	224	82.65	43	39.169	161	52.66	33	49.815	395	55.
20.3	2.937	148	23.70	29	12.327	214	83.08	13	39.008	154	52.99	29	49.420	392	56.
30.2	2.789	131	23.99	33	12.113	196	83.21	16	38.854	139	53.28	23	49.028	377	56.
May 10.2	2.658	109	24.32	38	11.917	167	83.05	42	38.715	116	53.51	19	48.651	350	56.
20.2	2.549	83	24.70	40	11.750	132	82.63	70	38.599	90	53.70	13	48.301	316	55.
30.2	2.466	54	25.10	42	11.618	93	81.93	93	38.509	59	53.83	8	47.985	273	54.
June 9.1	2.412	21	25.52	44	11.525	48	81.00	114	38.450	26	53.91	2	47.712	225	52.
19.1	2.391	11	25.96	45	11.477	4	79.86	131	38.424	6	53.93	3	47.487	169	50.
29.1	2.402	42	26.41	43	11.473	40	78.55	145	38.430	40	53.90	8	47.318	109	47.
July 9.1	2.444	74	26.84	39	11.513	85	77.10	156	38.470	73	53.82	15	47.209	44	45.
19.0	2.518	104	27.23	34	11.598	128	75.54	166	38.543	105	53.67	23	47.165	20	42.
29.0	2.622	132	27.57	24	11.726	168	73.88	171	38.648	134	53.44	30	47.185	89	39.
Aug. 8.0	2.754	161	27.81	15	11.894	206	72.17	174	38.782	163	53.14	40	47.274	156	36.
17.9	2.915	187	27.96	0	12.100	243	70.43	175	38.945	190	52.74	51	47.430	221	33.
27.9	3.102	212	27.96	18	12.343	276	68.68	175	39.135	217	52.23	63	47.651	285	30.
Sept. 6.9	3.314	234	27.78	35	12.619	309	66.93	171	39.352	240	51.60	77	47.936	344	28.
16.9	3.548	258	27.43	57	12.928	336	65.22	163	39.592	264	50.83	90	48.280	395	26.
26.8	3.806	276	26.86	79	13.264	364	63.59	156	39.856	285	49.93	103	48.675	438	24.
Oct. 6.8	4.082	293	26.07	98	13.628	385	62.03	144	40.141	304	48.90	117	49.113	471	23.
16.8	4.375	307	25.09	120	14.013	403	60.59	128	40.445	318	47.73	126	49.584	494	23.
26.8	4.682	316	23.89	135	14.416	413	59.31	108	40.763	327	46.47	132	50.078	499	23.
Nov. 5.7	4.998	317	22.54	147	14.829	417	58.23	86	41.090	331	45.15	136	50.577	491	24.
15.7	5.315	312	21.07	155	15.246	410	57.37	59	41.421	327	43.79	134	51.068	468	26.
25.7	5.627	299	19.52	157	15.656	393	56.78	30	41.748	316	42.45	127	51.536	428	28.
Dec. 5.6	5.926	278	17.95	154	16.049	366	56.48	0	42.064	293	41.18	115	51.964	374	31.
15.6	6.204	246	16.41	146	16.415	326	56.48	32	42.357	262	40.03	101	52.338	310	34.
25.6	6.450	207	14.95	132	16.741	276	56.80	62	42.619	225	39.02	83	52.648	232	38.
35.6	6.657		13.63		17.017		57.42		42.844		38.19		52.880		41.
Mean Place	0.915		31.93		9.656		79.70		36.816		58.31		48.714		31.
Sec δ, Tan δ	1.014		+0.166		1.378		+0.948		1.055		+0.336		1.955		−1.
$D_\psi \alpha$, $D_\omega \alpha$	+0.06		+0.01		+0.08		+0.04		+0.07		+0.01		+0.02		−0.
$D_\psi \delta$, $D_\omega \delta$	−0.2		+0.8		−0.2		+0.8		−0.2		+0.8		−0.2		+0.

FOR THE UPPER TRANSIT AT WASHINGTON.

hington n Time.	30 Monocerotis. Mag. 4.0 Right Ascension.		Declination.		θ Chamæleontis. Mag. 4.3 Right Ascension.		Declination.		o Ursæ Majoris. Mag. 3.5 Right Ascension.		Declination.		Groombridge 1450. Mag. 6.0 Right Ascension.		Declination.	
	h m 8 21		° ′ − 3 38		h m 8 23		° ′ −77 12		h m 8 23		° ′ +60 59		h m 8 27		° ′ +38 17	
	s		″		s		″		s		″		s		″	
a. 0.6	33.077		7.88		13.60		55.33		27.29		38.51		34.451		58.47	
10.5	33.258	181	9.88	200	13.87	27	59.13	380	27.63	34	40.19	168	34.693	242	58.89	42
20.5	33.392	134	11.73	185	13.95	8	63.03	390	27.87	24	42.14	195	34.877	184	59.59	70
30.5	33.477	85	13.39	166	13.83	12	66.91	388	28.02	15	44.28	214	34.998	121	60.49	90
b. 9.5	33.510	33	14.85	146	13.53	30	70.67	376	28.07	5	46.51	223	35.055	57	61.55	106
19.4	33.495	15	16.06	121	13.07	46	74.21	354	28.02	5	48.74	223	35.049	6	62.72	117
r. 1.4	33.437	58	17.04	98	12.45	62	77.48	327	27.88	14	50.86	212	34.986	63	63.92	120
11.4	33.342	95	17.78	74	11.71	74	80.39	291	27.67	21	52.79	193	34.872	114	65.08	116
21.4	33.217	125	18.30	52	10.87	84	82.88	249	27.39	28	54.43	164	34.719	153	66.15	107
31.3	33.074	143	18.59	29	9.94	93	84.91	203	27.06	33	55.73	130	34.539	180	67.06	91
r. 10.3	32.920	154	18.69	10	8.96	98	86.46	155	26.71	35	56.63	90	34.341	198	67.78	72
20.3	32.764	156	18.59	10	7.95	101	87.49	103	26.34	37	57.11	48	34.139	202	68.29	51
30.2	32.615	149	18.30	29	6.93	102	87.98	49	25.99	35	57.14	3	33.944	195	68.54	25
y 10.2	32.479	136	17.85	45	5.94	99	87.94	4	25.66	33	56.74	40	33.764	180	68.55	1
20.2	32.364	115	17.25	60	4.99	95	87.37	57	25.36	30	55.91	83	33.610	154	68.32	23
30.2	32.274	90	16.50	75	4.11	88	86.29	108	25.12	24	54.70	121	33.486	124	67.86	46
ne 9.1	32.209	65	15.64	86	3.31	80	84.72	157	24.93	19	53.14	156	33.398	88	67.18	68
19.1	32.175	34	14.67	97	2.62	69	82.73	199	24.80	13	51.29	185	33.347	51	66.32	86
29.1	32.170	5	13.62	105	2.07	55	80.36	237	24.75	5	49.18	211	33.337	10	65.30	102
ly 9.1	32.197	27	12.53	109	1.65	42	77.66	270	24.76	1	46.88	230	33.367	30	64.12	118
19.0	32.254	57	11.44	109	1.38	27	74.74	292	24.84	8	44.43	245	33.437	70	62.83	129
29.0	32.340	86	10.39	105	1.27	11	71.67	307	24.98	14	41.89	254	33.546	109	61.44	139
g. 8.0	32.455	115	9.42	97	1.33	6	68.56	311	25.18	20	39.30	259	33.691	145	59.97	147
17.9	32.598	143	8.57	85	1.55	22	65.52	304	25.45	27	36.73	257	33.873	182	58.43	154
27.9	32.769	171	7.91	66	1.95	40	62.63	289	25.78	33	34.20	253	34.088	215	56.85	158
pt. 6.9	32.966	197	7.47	44	2.50	55	60.03	260	26.16	38	31.77	243	34.335	247	55.25	160
16.9	33.188	222	7.30	17	3.20	70	57.81	222	26.60	44	29.48	229	34.612	277	53.64	161
26.8	33.432	244	7.43	13	4.02	82	56.06	175	27.07	47	27.38	210	34.919	307	52.04	160
t. 6.8	33.699	267	7.88	45	4.94	92	54.85	121	27.58	51	25.50	188	35.250	331	50.47	157
16.8	33.983	284	8.66	78	5.94	100	54.26	59	28.13	55	23.90	160	35.605	355	48.97	150
26.8	34.283	300	9.77	111	6.97	103	54.34	8	28.70	57	22.61	129	35.977	372	47.58	139
v. 5.7	34.592	309	11.17	140	8.02	105	55.07	73	29.28	58	21.66	95	36.363	386	46.32	126
15.7	34.903	311	12.84	167	9.03	101	56.47	140	29.87	59	21.11	55	36.754	391	45.25	107
25.7	35.210	307	14.71	187	9.97	94	58.47	200	30.45	58	20.96	15	37.142	388	44.39	86
c. 5.6	35.506	296	16.73	202	10.82	85	61.03	256	31.00	55	21.24	28	37.517	375	43.79	60
15.6	35.780	274	18.84	211	11.52	70	64.07	304	31.51	51	21.95	71	37.867	350	43.47	32
25.6	36.023	243	20.95	211	12.08	56	67.49	342	31.95	44	23.06	111	38.182	315	43.43	4
35.6	36.228	205	23.01	206	12.46	38	71.17	368	32.34	39	24.54	148	38.453	271	43.69	26
Place	30.868		5.42		9.121		62.21		22.930		48.78		31.536		67.19	
l, Tan δ	1.002		−0.064		4.520		−4.409		2.063		+1.804		1.274		+0.790	
D α	+0.06		0.00		−0.03		−0.17		+0.10		+0.07		+0.08		+0.03	
D δ	−0.2		+0.8		−0.2		+0.8		−0.2		+0.8		−0.2		+0.8	

FOR THE UPPER TRANSIT AT .

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FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	δ Hydræ. Mag. 3.5 Right Ascension.		δ Hydræ. Mag. 3.5 Declination.		δ Argus. Mag. 2.0 Right Ascension.		δ Argus. Mag. 2.0 Declination.		σ² Cancri (mean). Mag. 5.5 Right Ascension.		σ² Cancri (mean). Mag. 5.5 Declination.		ζ Hyd[ræ]. Mag. Right Ascension.	
	h m		° ′		h m		° ′		h m		° ′		h m	
	8 42		+ 6 43		8 42		−54 24		8 49		+30 53		8 51	
	s		″		s		″		s		″		s	
Jan. 0.6	25.176	208	22.07	149	26.884	215	8.94	376	13.700	247	31.17	12	2.708	215
10.6	25.384	161	20.58	130	27.099	140	12.70	383	13.947	196	31.05	15	2.923	170
20.5	25.545	112	19.28	109	27.239	63	16.53	380	14.143	138	31.20	40	3.093	120
30.5	25.657	60	18.19	88	27.302	14	20.33	366	14.281	80	31.60	61	3.213	68
Feb. 9.5	25.717	11	17.31	66	27.288	86	23.99	343	14.361	22	32.21	78	3.281	19
19.5	25.728	36	16.65	46	27.202	150	27.42	314	14.383	32	32.99	87	3.300	28
Mar. 1.4	25.692	75	16.19	26	27.052	208	30.56	279	14.351	82	33.86	93	3.272	69
11.4	25.617	108	15.93	12	26.844	254	33.35	237	14.269	120	34.79	91	3.203	100
21.4	25.509	130	15.81	3	26.590	290	35.72	192	14.149	148	35.70	86	3.103	126
31.3	25.379	145	15.84	15	26.300	313	37.64	144	14.001	168	36.56	74	2.977	141
Apr. 10.3	25.234	149	15.99	25	25.987	323	39.08	93	13.833	175	37.30	60	2.836	146
20.3	25.085	146	16.24	31	25.664	326	40.01	43	13.658	173	37.90	45	2.690	144
30.3	24.939	135	16.55	38	25.338	317	40.44	8	13.485	161	38.35	25	2.546	135
May 10.2	24.804	117	16.93	44	25.021	297	40.36	58	13.324	145	38.60	7	2.411	119
20.2	24.687	97	17.37	48	24.724	273	39.78	106	13.179	118	38.67	11	2.292	99
30.2	24.590	70	17.85	51	24.451	239	38.72	151	13.061	91	38.56	30	2.193	74
June 9.2	24.520	44	18.36	52	24.212	200	37.21	191	12.970	57	38.26	45	2.119	49
19.1	24.476	14	18.88	53	24.012	155	35.30	227	12.913	24	37.81	61	2.070	20
29.1	24.462	16	19.41	52	23.857	106	33.03	256	12.889	10	37.20	75	2.050	7
July 9.1	24.478	45	19.93	49	23.751	52	30.47	277	12.899	45	36.45	88	2.057	37
19.0	24.523	74	20.42	42	23.699	1	27.70	290	12.944	79	35.57	99	2.094	66
29.0	24.597	101	20.84	33	23.700	59	24.80	293	13.023	113	34.58	111	2.160	94
Aug. 8.0	24.698	130	21.17	22	23.759	116	21.87	287	13.136	144	33.47	122	2.254	121
18.0	24.828	158	21.39	6	23.875	174	19.00	269	13.280	177	32.25	129	2.375	148
27.9	24.986	184	21.45	11	24.049	233	16.31	242	13.457	207	30.96	138	2.523	177
Sept. 6.9	25.170	210	21.34	33	24.282	285	13.89	205	13.664	236	29.58	146	2.700	203
16.9	25.380	235	21.01	55	24.567	335	11.84	158	13.900	266	28.12	152	2.903	228
26.9	25.615	259	20.46	80	24.902	378	10.26	104	14.166	291	26.60	156	3.131	255
Oct. 6.8	25.874	281	19.66	102	25.280	413	9.22	44	14.457	317	25.04	157	3.386	276
16.8	26.155	298	18.64	126	25.693	440	8.78	19	14.774	337	23.47	154	3.662	296
26.8	26.453	311	17.38	145	26.133	453	8.97	84	15.111	355	21.93	150	3.958	311
Nov. 5.7	26.764	319	15.93	162	26.586	455	9.81	148	15.466	363	20.43	140	4.269	319
15.7	27.083	319	14.31	171	27.041	440	11.29	207	15.829	365	19.03	125	4.588	321
25.7	27.402	309	12.60	177	27.481	415	13.36	260	16.194	356	17.78	106	4.909	314
Dec. 5.7	27.711	293	10.83	177	27.896	374	15.96	306	16.550	340	16.72	84	5.223	296
15.6	28.004	265	9.06	169	28.270	319	19.02	341	16.890	310	15.88	56	5.519	271
25.6	28.269	230	7.37	157	28.589	258	22.43	365	17.200	272	15.32	28	5.790	238
35.6	28.499		5.80		28.847		26.08		17.472		15.04		6.028	
Mean Place	22.940		26.95		24.502		14.47		11.090		40.50		0.503	
Sec δ, Tan δ	1.007		+0.118		1.718		−1.397		1.165		+0.598		1.006	
$D_\psi \alpha$, $D_\omega \alpha$	+0.06		+0.01		+0.03		−0.06		+0.07		+0.03		+0.06	
$D_\psi \delta$, $D_\omega \delta$	−0.3		+0.8		−0.3		+0.8		−0.3		+0.7		−0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

ι Ursæ Majoris. Mag. 3.1				α Cancri. Mag. 4.3				b^1 Carinæ. Mag. 5.1				κ Ursæ Majoris. Mag. 3.7			
Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.	
h m 8 53		° ′ +48 21		h m 8 53		° ′ +12 10		h m 8 54		° ′ −58 54		h m 8 57		° ′ +47 28	
s		″		s		″		s		″		s		″	
35.169	304	54.22	82	59.255	223	40.55	121	58.955	248	25.15	377	61.141	305	56.04	75
35.473	239	55.04	115	59.478	177	39.34	101	59.203	166	28.92	388	61.446	243	56.79	107
35.712	168	56.19	140	59.655	128	38.33	78	59.369	82	32.80	388	61.689	174	57.86	134
35.880	93	57.59	160	59.783	75	37.55	57	59.451	3	36.68	378	61.863	100	59.20	155
35.973	21	59.19	172	59.858	23	36.98	34	59.448	83	40.46	360	61.963	28	60.75	169
35.994	50	60.91	175	59.881	24	36.64	15	59.365	159	44.06	333	61.991	42	62.44	172
35.944	112	62.66	168	59.857	66	36.49	0	59.206	221	47.39	299	61.949	103	64.16	170
35.832	164	64.34	156	59.791	99	36.49	14	58.985	277	50.38	259	61.846	154	65.86	155
35.668	203	65.90	135	59.692	126	36.63	25	58.708	317	52.97	215	61.692	194	67.41	137
35.465	229	67.25	108	59.566	140	36.88	30	58.391	347	55.12	168	61.498	221	68.78	112
35.236	242	68.33	78	59.426	147	37.18	35	58.044	366	56.80	118	61.277	234	69.90	82
34.994	242	69.11	45	59.279	146	37.53	37	57.678	370	57.98	67	61.043	236	70.72	50
34.752	231	69.56	10	59.133	137	37.90	38	57.308	366	58.65	15	60.807	225	71.22	16
34.521	208	69.66	24	58.996	121	38.28	38	56.942	351	58.80	38	60.582	204	71.38	18
34.313	179	69.42	58	58.875	101	38.66	37	56.591	325	58.42	87	60.378	176	71.20	50
34.134	144	68.84	88	58.774	75	39.03	34	56.266	292	57.55	135	60.202	142	70.70	82
33.990	102	67.96	117	58.699	50	39.37	31	55.974	252	56.20	179	60.060	103	69.88	111
33.888	58	66.79	142	58.649	21	39.68	28	55.722	205	54.41	217	59.957	60	68.77	135
33.830	14	65.37	164	58.628	6	39.96	22	55.517	152	52.24	250	59.897	16	67.42	159
33.816	33	63.73	182	58.634	37	40.18	17	55.365	95	49.74	274	59.881	28	65.83	176
33.849	78	61.91	196	58.671	66	40.35	9	55.270	32	47.00	291	59.909	72	64.07	191
33.927	122	59.95	209	58.737	94	40.44	1	55.238	30	44.09	298	59.981	116	62.16	204
34.049	166	57.86	216	58.831	123	40.43	13	55.268	97	41.11	294	60.097	158	60.12	213
34.215	208	55.70	220	58.954	150	40.30	28	55.365	165	38.17	282	60.255	200	57.99	218
34.423	249	53.50	221	59.104	178	40.02	43	55.530	231	35.35	258	60.455	241	55.81	220
34.672	288	51.29	219	59.282	205	39.59	62	55.761	295	32.77	223	60.696	278	53.61	219
34.960	323	49.10	212	59.487	232	38.97	81	56.056	354	30.54	179	60.974	316	51.42	213
35.283	359	46.98	203	59.719	257	38.16	100	56.410	406	28.75	126	61.290	350	49.29	205
35.642	391	44.95	190	59.976	280	37.16	120	56.816	449	27.49	66	61.640	381	47.24	192
36.033	415	43.05	170	60.256	301	35.96	137	57.265	482	26.83	5	62.021	409	45.32	175
36.448	436	41.35	148	60.557	315	34.59	151	57.747	500	26.78	61	62.430	429	43.57	152
36.884	449	39.87	119	60.872	325	33.08	162	58.247	505	27.39	128	62.859	442	42.05	126
37.333	448	38.68	88	61.197	328	31.46	166	58.752	491	28.67	190	63.301	444	40.79	96
37.781	440	37.80	53	61.525	321	29.80	166	59.243	467	30.57	244	63.745	437	39.83	60
38.221	418	37.27	15	61.846	304	28.14	160	59.710	421	33.01	296	64.182	416	39.23	23
38.639	382	37.12	23	62.150	281	26.54	149	60.131	366	35.97	334	64.598	382	39.00	16
39.021	334	37.35	61	62.431	245	25.05	133	60.497	293	39.31	362	64.980	335	39.16	53
39.355		37.96		62.676		23.72		60.790		42.93		65.315		39.69	
31.958		66.23		56.993		46.93		56.499		31.66		57.998		68.31	
1.505		+1.125		1.023		+0.216		1.937		−1.658		1.480		+1.091	
+0.08		+0.05		+0.07		+0.01		+0.03		−0.08		+0.08		+0.05	
−0.3		+0.7		−0.3		+0.7		−0.3		+0.7		−0.3		+0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

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FOR THE UPPER TRANSIT AT WASHINGTON.

gton Time.	β Argus. Mag. 1.8				83 Cancri. Mag. 6.6				ι Argus. Mag. 2.2				40 Lyncis. Mag. 3.3			
	Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.	
	h m 9 12		° ′ −69 22		h m 9 14		° ′ +18 3		h m 9 14		° ′ −58 55		h m 9 16		° ′ +34 44	
	s		″		s		″		s		″		s		″	
0.6	20.56	35	22.50	369	23.394	247	19.83	99	54.335	286	28.40	368	2.790	280	27.64	8
10.6	20.91	23	26.19	388	23.641	202	18.84	72	54.621	208	32.08	385	3.070	229	27.56	26
20.6	21.14	12	30.07	396	23.843	152	18.12	48	54.829	123	35.93	389	3.299	173	27.82	54
30.5	21.26	1	34.03	394	23.995	99	17.64	23	54.952	39	39.82	383	3.472	112	28.36	80
9.5	21.27	11	37.97	382	24.094	45	17.41	1	54.991	43	43.65	369	3.584	50	29.16	99
19.5	21.16	23	41.79	360	24.139	5	17.40	19	54.948	117	47.34	345	3.634	7	30.15	113
1.4	20.93	31	45.39	333	24.134	48	17.59	33	54.831	185	50.79	315	3.627	60	31.28	121
11.4	20.62	39	48.72	296	24.086	87	17.92	43	54.646	243	53.94	279	3.567	104	32.49	118
21.4	20.23	46	51.68	256	23.999	116	18.35	50	54.403	289	56.73	237	3.463	137	33.67	112
31.4	19.77	51	54.24	210	23.883	135	18.85	53	54.114	323	59.10	192	3.326	163	34.79	101
10.3	19.26	55	56.34	160	23.748	146	19.38	52	53.791	347	61.02	143	3.163	176	35.80	84
20.3	18.71	56	57.94	109	23.602	147	19.90	49	53.444	357	62.45	92	2.987	180	36.64	63
30.3	18.15	57	59.03	56	23.455	141	20.39	43	53.087	358	63.37	39	2.807	174	37.27	42
10.3	17.58	56	59.59	1	23.314	129	20.82	37	52.729	347	63.76	11	2.633	159	37.69	18
20.2	17.02	53	59.60	52	23.185	111	21.19	29	52.382	330	63.65	62	2.474	140	37.87	4
30.2	16.49	50	59.08	103	23.074	89	21.48	19	52.052	302	63.03	111	2.334	113	37.83	29
e 9.2	15.99	45	58.05	151	22.985	64	21.67	12	51.750	267	61.92	156	2.221	85	37.54	50
19.1	15.54	39	56.54	196	22.921	38	21.79	2	51.483	225	60.36	197	2.136	54	37.04	71
29.1	15.15	31	54.58	234	22.883	9	21.81	7	51.258	177	58.39	232	2.082	20	36.33	89
y 9.1	14.84	23	52.24	266	22.874	20	21.74	17	51.081	123	56.07	262	2.062	14	35.44	107
19.1	14.61	14	49.58	288	22.894	47	21.57	29	50.958	65	53.45	281	2.076	48	34.37	124
29.0	14.47	4	46.70	304	22.941	77	21.28	40	50.893	1	50.64	293	2.124	82	33.13	136
g. 8.0	14.43	5	43.66	307	23.018	106	20.88	52	50.892	64	47.71	294	2.206	116	31.77	150
18.0	14.48	15	40.59	299	23.124	133	20.36	68	50.956	132	44.77	286	2.322	150	30.27	162
28.0	14.63	27	37.60	282	23.257	164	19.68	82	51.088	199	41.91	265	2.472	183	28.65	170
pt. 6.9	14.90	36	34.78	253	23.421	192	18.86	97	51.287	265	39.26	235	2.655	217	26.95	178
16.9	15.26	46	32.25	213	23.613	222	17.89	115	51.552	329	36.91	195	2.872	249	25.17	184
26.9	15.72	54	30.12	165	23.835	250	16.74	129	51.881	384	34.96	146	3.121	280	23.33	187
t. 6.8	16.26	60	28.47	108	24.085	275	15.45	144	52.265	435	33.50	88	3.401	311	21.46	186
16.8	16.86	66	27.39	45	24.360	300	14.01	155	52.700	472	32.62	27	3.712	336	19.60	182
26.8	17.52	69	26.94	20	24.660	319	12.46	165	53.172	499	32.35	37	4.048	358	17.78	174
ov. 5.8	18.21	70	27.14	88	24.979	331	10.81	168	53.671	510	32.72	104	4.406	373	16.04	159
15.7	18.91	69	28.02	153	25.310	338	9.13	168	54.181	506	33.76	160	4.779	381	14.45	141
25.7	19.60	66	29.55	214	25.648	335	7.45	160	54.687	484	35.42	225	5.160	378	13.04	117
ec. 5.7	20.26	59	31.69	268	25.983	323	5.85	150	55.171	448	37.67	277	5.538	364	11.87	91
15.7	20.85	52	34.37	315	26.306	300	4.35	133	55.619	396	40.44	320	5.902	339	10.96	58
25.6	21.37	42	37.52	352	26.606	269	3.02	111	56.015	334	43.64	352	6.241	303	10.38	26
35.6	21.79		41.04		26.875		1.91		56.349		47.16		6.544		10.12	
n Place	17.664		30.83		21.132		28.33.		51.990		35.56		0.205		39.40	
δ, Tan δ	*2.839*		*−2.657*		*1.052*		+0.326		1.938		−1.660		1.217		+0.693	
D_w α	*+0.01*		*−0.13*		*+0.07*		+0.02		+0.03		−0.08		+0.07		+0.03	
D_w δ	*−0.3*		*+0.7*		*−0.3*		+0.7		−0.3		+0.7		−0.3		+0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	θ Pyxidis. Mag. 4.9 Right Ascension.		θ Pyxidis. Declination.		α Hydræ. Mag. 2.2 Right Ascension.		α Hydræ. Declination.		h Ursæ Majoris. Mag. 3.8 Right Ascension.		h Ursæ Majoris. Declination.		δ Ursæ Ma[joris] Mag. [...] Right Ascension.	
	h m		° ′		h m		° ′		h m		° ′		h m	
	9 17		−25 36		9 23		− 8 17		9 25		+63 24		9 27	
	s		″		s		″		s		″		s	
Jan. 0.6	50.847		42.28		32.533		56.32		4.30		76.11		15.32	
10.6	51.078	231	45.29	301	32.769	236	58.65	233	4.76	46	77.40	129	15.90	58
20.6	51.261	183	48.30	301	32.960	191	60.87	222	5.14	38	79.10	170	16.36	46
30.5	51.392	131	51.23	293	33.108	148	62.93	206	5.42	28	81.13	203	16.71	35
Feb. 9.5	51.471	79	53.99	276	33.196	88	64.79	186	5.59	17	83.40	227	16.92	21
19.5	51.496	25	56.52	253	33.240	44	66.41	162	5.65	6	85.82	242	16.99	7
Mar. 1.5	51.472	24	58.80	228	33.238	2	67.79	138	5.62	3	88.28	246	16.93	6
11.4	51.405	67	60.77	197	33.193	45	68.89	110	5.49	13	90.66	238	16.74	19
21.4	51.303	102	62.43	166	33.113	80	69.75	86	5.28	21	92.86	220	16.45	29
31.4	51.171	132	63.73	130	33.006	107	70.35	60	5.00	28	94.81	195	16.06	39
Apr. 10.3	51.020	151	64.70	97	32.880	126	70.72	37	4.67	33	96.40	159	15.59	47
20.3	50.857	163	65.30	60	32.743	137	70.85	13	4.30	37	97.60	120	15.09	50
30.3	50.691	166	65.54	24	32.608	140	70.77	8	3.91	39	98.35	75	14.56	53
May 10.3	50.529	162	65.44	10	32.467	136	70.47	30	3.53	38	98.63	28	14.03	53
20.2	50.376	153	65.01	43	32.341	126	70.00	47	3.16	37	98.45	18	13.52	51
30.2	50.239	137	64.24	77	32.229	112	69.35	65	2.83	33	97.81	64	13.04	48
June 9.2	50.121	118	63.18	106	32.135	94	68.55	80	2.54	29	96.72	109	12.62	42
19.2	50.023	98	61.86	132	32.063	72	67.62	93	2.30	24	95.24	148	12.27	35
29.1	49.953	70	60.30	156	32.013	50	66.58	104	2.11	19	93.40	184	11.99	28
July 9.1	49.911	42	58.57	173	31.988	25	65.46	112	1.99	12	91.23	217	11.79	20
19.1	49.896	15	56.70	187	31.988	0	64.31	115	1.93	6	88.80	243	11.68	11
29.0	49.913	17	54.76	194	32.016	28	63.17	114	1.94	1	86.15	265	11.67	1
Aug. 8.0	49.960	47	52.81	195	32.071	55	62.07	110	2.03	9	83.34	281	11.74	7
18.0	50.042	82	50.94	187	32.154	83	61.07	100	2.18	15	80.43	291	11.90	16
28.0	50.157	115	49.23	171	32.267	113	60.23	84	2.39	21	77.46	297	12.15	25
Sept. 6.9	50.305	148	47.72	151	32.408	141	59.61	62	2.66	27	74.50	296	12.49	34
16.9	50.487	182	46.51	121	32.581	173	59.24	37	3.00	34	71.59	291	12.92	43
26.9	50.705	218	45.67	84	32.783	202	59.16	8	3.40	40	68.79	280	13.43	51
Oct. 6.9	50.953	248	45.26	41	33.014	231	59.42	26	3.86	46	66.17	262	14.01	58
16.8	51.231	278	45.30	4	33.273	259	60.04	62	4.37	51	63.76	241	14.66	65
26.8	51.535	304	45.83	53	33.556	283	61.00	96	4.93	56	61.65	211	15.37	71
Nov. 5.8	51.858	323	46.85	102	33.860	304	62.32	132	5.52	59	59.88	177	16.12	75
15.7	52.194	336	48.34	149	34.176	316	63.96	164	6.14	62	58.49	139	16.90	78
25.7	52.533	339	50.27	193	34.499	323	65.87	191	6.77	63	57.55	94	17.70	80
Dec. 5.7	52.866	333	52.57	230	34.819	320	68.01	214	7.39	62	57.10	45	18.49	79
15.7	53.183	317	55.19	262	35.126	307	70.28	227	7.99	60	57.13	3	19.25	76
25.6	53.473	290	58.02	283	35.413	287	72.64	236	8.55	56	57.67	54	19.96	71
35.6	53.727	254	60.99	297	35.668	255	74.99	235	9.05	50	58.68	101	20.59	63
Mean Place	48.883		43.41		30.551		53.44		0.187		92.34		10.177	
Sec δ, Tan δ	*1.109*		−0.480		1.011		−0.146		2.235		+1.999		2.951	
$D_\psi a$, $D_\omega a$	+0.05		−0.02		+0.06		−0.01		+0.09		+0.10		+0.11	
$D_\psi \delta$, $D_\omega \delta$	−0.3		+0.7		−0.3		+0.6		−0.3		+0.8		−0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

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...n.	Declination.	
	+36 45	
	″	
98	47.55	−5
48	47.50	30
90	47.80	61
30	48.41	88
68	49.29	111
7	50.40	125
47	51.05	133
94	52.98	133
32	54.31	127
60	55.58	113
75	56.71	97
82	57.68	75
79	58.43	51
67	58.94	25
50	59.19	0
25	59.19	27
98	58.92	50
08	58.42	74
34	57.68	96
2	56.72	116
32	55.56	133
67	54.23	150
02	52.73	164
36	51.09	176
72	49.33	186
07	47.47	195
40	45.52	200
75	43.52	203
07	41.49	201
35	39.48	196
61	37.52	187
78	35.65	170
89	33.95	150
58	32.15	124
78	31.21	95
34	30.26	61
21	29.65	25
	29.40	
	60.55	
	+0.747	
	+0.04	
	+0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ο Leonis. Mag. 3.8 Right Ascension.		ο Leonis. Declination.		θ Antliæ. Mag. 5.0 Right Ascension.		θ Antliæ. Declination.		ε Leonis. Mag. 3.1 Right Ascension.		ε Leonis. Declination.		υ Arg… Mag. 3… Right Ascension.	
	h m		° ′		h m		° ′		h m		° ′		h m	
	9 36		+10 15		9 40		−27 23		9 41		+24 8		9 44	
	s		″		s		″		s		″		s	
Jan. 0.6	45.437	256	66.53	149	31.957	253	18.68	303	10.823	278	73.85	78	64.05	38
10.6	45.693	214	65.04	125	32.210	208	21.71	305	11.101	234	73.07	50	64.43	29
20.6	45.907	166	63.79	102	32.418	157	24.76	301	11.335	186	72.57	18	64.72	21
30.5	46.073	117	62.77	76	32.575	103	27.77	288	11.521	131	72.39	9	64.93	10
Feb. 9.5	46.190	66	62.01	53	32.678	51	30.65	267	11.652	76	72.48	34	65.03	1
19.5	46.256	17	61.48	28	32.729	1	33.32	244	11.728	23	72.82	54	65.04	9
Mar. 1.5	46.273	27	61.20	9	32.730	45	35.76	214	11.751	26	73.36	71	64.95	16
11.4	46.246	65	61.11	8	32.685	84	37.90	184	11.725	67	74.07	79	64.79	24
21.4	46.181	94	61.19	22	32.601	115	39.74	150	11.658	101	74.86	84	64.55	31
31.4	46.087	117	61.41	32	32.486	137	41.24	115	11.557	126	75.70	83	64.24	35
Apr. 10.4	45.970	129	61.73	40	32.349	152	42.39	79	11.431	141	76.53	78	63.89	39
20.3	45.841	135	62.13	44	32.197	159	43.18	45	11.290	148	77.31	68	63.50	41
30.3	45.706	133	62.57	47	32.038	160	43.63	8	11.142	147	77.99	58	63.09	43
May 10.3	45.573	125	63.04	47	31.878	155	43.71	26	10.995	139	78.57	44	62.66	43
20.2	45.448	110	63.51	46	31.723	144	43.45	60	10.856	124	79.01	28	62.23	42
30.2	45.338	94	63.97	43	31.579	128	42.85	91	10.732	107	79.29	14	61.81	40
June 9.2	45.244	72	64.40	41	31.451	109	41.94	120	10.625	85	79.43	1	61.41	36
19.2	45.172	51	64.81	35	31.342	88	40.74	145	10.540	59	79.42	18	61.05	33
29.1	45.121	26	65.16	30	31.254	62	39.29	167	10.481	33	79.24	33	60.72	28
July 9.1	45.095	2	65.46	22	31.192	35	37.62	182	10.448	7	78.91	48	60.44	22
19.1	45.093	25	65.68	15	31.157	8	35.80	192	10.441	22	78.43	64	60.22	16
29.1	45.118	51	65.83	3	31.149	24	33.88	196	10.463	50	77.79	78	60.06	8
Aug. 8.0	45.169	79	65.86	11	31.173	57	31.92	192	10.513	81	77.01	93	59.98	0
18.0	45.248	108	65.75	26	31.230	90	30.00	180	10.594	111	76.08	109	59.98	8
28.0	45.356	135	65.49	43	31.320	127	28.20	160	10.705	141	74.99	124	60.06	16
Sept. 6.9	45.491	166	65.06	64	31.447	163	26.60	134	10.846	173	73.75	138	60.22	25
16.9	45.657	195	64.42	84	31.610	200	25.26	99	11.019	205	72.37	153	60.47	33
26.9	45.852	225	63.58	105	31.810	234	24.27	59	11.224	236	70.84	164	60.80	41
Oct. 6.9	46.077	255	62.53	128	32.044	269	23.68	14	11.460	267	69.20	175	61.21	48
16.8	46.332	279	61.25	146	32.313	298	23.54	36	11.727	296	67.45	181	61.69	54
26.8	46.611	302	59.79	165	32.611	321	23.90	85	12.023	319	65.64	185	62.23	57
Nov. 5.8	46.913	319	58.14	176	32.932	339	24.75	133	12.342	338	63.79	184	62.80	60
15.8	47.232	329	56.38	185	33.271	346	26.08	179	12.680	351	61.95	176	63.40	61
25.7	47.561	330	54.53	187	33.617	345	27.87	220	13.031	351	60.19	164	64.01	59
Dec. 5.7	47.891	321	52.66	184	33.962	333	30.07	253	13.382	345	58.55	145	64.60	56
15.7	48.212	302	50.82	174	34.295	309	32.60	279	13.727	327	57.10	123	65.16	50
25.6	48.514	274	49.08	158	34.604	276	35.39	295	14.054	297	55.87	95	65.66	42
35.6	48.788		47.50		34.880		38.34		14.351		54.92		66.08	
Mean Place	43.370		74.25		30.080		20.26		8.593		85.02		61.689	
Sec δ, Tan δ	*1.016*		+0.181		1.126		−0.518		1.096		+0.448		2.339	
Dψ α, Dω α	*+0.06*		+0.01		+0.05		−0.03		+0.07		+0.02		+0.03	
Dψ δ, Dω δ	*−0.3*		+0.6		−0.3		+0.6		−0.3		+0.6		−0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

gton Time.	υ Ursæ Majoris. Mag. 3.9 Right Ascension.		υ Ursæ Majoris. Declination.		6 Sextantis. Mag. 6.0 Right Ascension.		6 Sextantis. Declination.		μ Leonis. Mag. 4.1 Right Ascension.		μ Leonis. Declination.		Groombridge 1586. Mag. 6.0 Right Ascension.		Groombridge 1586. Declination.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	9 45		+59 25		9 47		− 3 51		9 48		+26 23		9 50		+73 15	
	s		″		s		″		s		″		s		″	
0.6	9.550		30.01		5.048		18.04		4.987		42.48		65.06		70.64	
10.6	9.989	439	30.93	92	5.302	254	20.20	216	5.274	287	41.77	71	65.77	71	72.05	141
20.6	10.357	368	32.29	136	5.516	214	22.24	204	5.517	243	41.37	40	66.36	59	73.93	188
30.6	10.643	286	34.02	173	5.685	169	24.10	186	5.711	194	41.29	8	66.82	46	76.20	227
9.5	10.839	196	36.06	204	5.805	120	25.73	163	5.850	139	41.50	21	67.13	31	78.77	257
19.5	10.941	102	38.29	223	5.875	70	27.14	141	5.935	85	41.96	46	67.27	14	81.52	275
1.5	10.952	11	40.63	234	5.898	23	28.29	115	5.966	31	42.64	68	67.27	0	84.33	281
11.4	10.877	75	42.97	234	5.878	20	29.21	92	5.947	19	43.46	82	67.11	16	87.09	276
21.4	10.723	154	45.19	222	5.821	57	29.87	66	5.883	64	44.38	92	66.81	30	89.67	258
31.4	10.506	217	47.21	202	5.735	86	30.31	44	5.785	98	45.34	96	66.40	41	91.98	231
10.4	10.238	268	48.95	174	5.627	108	30.53	22	5.660	125	46.28	94	65.89	51	93.93	195
20.3	9.935	303	50.35	140	5.504	123	30.57	4	5.518	142	47.14	86	65.32	57	95.43	150
30.3	9.613	322	51.33	98	5.375	129	30.44	13	5.368	150	47.90	76	64.70	62	96.45	102
10.3	9.287	326	51.89	56	5.246	129	30.14	30	5.218	150	48.53	63	64.06	64	96.96	51
20.2	8.970	317	52.00	11	5.123	123	29.70	44	5.074	144	49.00	47	63.43	63	96.92	4
30.2	8.675	295	51.66	34	5.012	111	29.14	56	4.943	131	49.28	28	62.83	60	96.35	57
9.2	8.411	264	50.90	76	4.914	98	28.46	68	4.831	112	49.40	12	62.28	55	95.28	107
19.2	8.185	226	49.72	118	4.835	79	27.69	77	4.739	92	49.34	6	61.79	49	93.74	154
29.1	8.005	180	48.16	156	4.775	60	26.85	84	4.672	67	49.09	25	61.38	41	91.76	198
9.1	7.876	129	46.27	189	4.737	38	25.98	87	4.630	42	48.68	41	61.06	32	89.42	234
19.1	7.799	77	44.09	218	4.723	14	25.09	89	4.616	14	48.09	59	60.84	22	86.73	269
29.1	7.778	21	41.65	244	4.733	10	24.22	87	4.631	15	47.33	76	60.72	12	83.77	296
8.0	7.814	36	39.02	263	4.769	36	23.41	81	4.674	43	46.41	92	60.71	1	80.62	315
18.0	7.908	94	36.24	278	4.832	63	22.72	69	4.748	74	45.34	107	60.80	9	77.33	329
28.0	8.060	152	33.35	289	4.922	90	22.16	56	4.852	104	44.10	124	61.00	20	73.95	338
t. 6.9	8.269	209	30.42	293	5.043	121	21.79	37	4.987	135	42.72	138	61.31	31	70.57	338
16.9	8.535	266	27.49	293	5.195	152	21.67	12	5.156	169	41.20	152	61.71	40	67.24	333
26.9	8.857	322	24.61	288	5.377	182	21.82	15	5.357	201	39.54	166	62.22	51	64.03	321
6.9	9.233	376	21.85	276	5.591	214	22.25	43	5.590	233	37.77	177	62.82	60	61.01	302
16.8	9.659	426	19.27	258	5.835	244	23.01	76	5.855	265	35.92	185	63.52	70	58.24	277
26.8	10.130	471	16.91	236	6.106	271	24.09	108	6.150	295	34.01	191	64.29	77	55.80	244
v. 5.8	10.640	510	14.86	205	6.402	296	25.47	138	6.470	320	32.09	192	65.12	83	53.75	205
15.8	11.180	540	13.15	171	6.715	313	27.14	167	6.811	341	30.21	188	66.00	88	52.14	161
25.7	11.736	556	11.84	131	7.038	323	29.03	189	7.165	354	28.42	179	66.91	91	51.02	112
c. 5.7	12.296	560	11.00	84	7.364	326	31.11	208	7.522	357	26.78	164	67.82	91	50.44	58
15.7	12.842	546	10.65	35	7.682	318	33.29	218	7.873	351	25.34	144	68.71	89	50.44	0
25.6	13.361	519	10.78	13	7.982	300	35.51	222	8.207	334	24.16	118	69.56	85	50.99	55
35.6	13.831	470	11.41	63	8.255	273	37.72	221	8.513	306	23.26	90	70.31	75	52.09	110
Place	6.034		47.52		3.136		13.59		2.755		54.51		59.596		89.75	
), Tan δ	*1.966*		*+1.693*		*1.002*		−0.067		1.116		+0.496		3.474		+3.327	
$D_\omega \alpha$	*+0.09*		*+0.09*		*+0.06*		0.00		+0.07		+0.03		+0.11		+0.19	
$D_\omega \delta$	*−0.3*		*+0.6*		*−0.3*		+0.5		−0.3		+0.5		−0.3		+0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	19 Leonis Minoris. Mag. 5.2 Right Ascension.		Declination.		φ Argus. Mag. 3.7 Right Ascension.		Declination.	
	h m 9 52		° ′ +41 26		h m 9 53		° ′ −54 10	
	s		″		s		″	
Jan. 0.6	38.951		50.28		58.764		13.67	
10.6	39.284	333	50.27	1	59.093	329	17.12	345
20.6	39.567	283	50.67	40	59.357	264	20.78	366
30.6	39.794	227	51.44	77	59.551	194	24.55	377
Feb. 9.5	39.958	164	52.54	110	59.672	121	28.33	378
19.5	40.055	97	53.87	133	59.718	46	32.02	369
Mar. 1.5	40.090	35	55.38	151	59.697	21	35.53	351
11.4	40.065	25	56.99	161	59.611	86	38.80	327
21.4	39.986	79	58.62	163	59.467	144	41.76	296
31.4	39.864	122	60.18	156	59.278	189	44.36	260
Apr. 10.4	39.708	156	61.61	143	59.052	226	46.56	220
20.3	39.529	179	62.83	122	58.796	256	48.30	174
30.3	39.338	191	63.82	99	58.522	274	49.57	127
May 10.3	39.145	193	64.52	70	58.240	282	50.36	79
20.3	38.957	188	64.93	41	57.957	283	50.66	30
30.2	38.782	175	65.03	10	57.681	276	50.45	21
June 9.2	38.630	152	64.80	23	57.420	261	49.77	68
19.2	38.503	127	64.29	51	57.180	240	48.62	115
29.1	38.403	100	63.47	82	56.969	211	47.06	156
July 9.1	38.336	67	62.39	108	56.790	179	45.09	197
19.1	38.302	34	61.08	131	56.652	138	42.83	226
29.1	38.301	1	59.51	157	56.559	93	40.28	255
Aug. 8.0	38.338	37	57.76	175	56.514	45	37.59	269
18.0	38.412	74	55.85	191	56.524	10	34.81	278
28.0	38.523	111	53.77	208	56.591	67	32.05	276
Sept. 7.0	38.671	148	51.59	218	56.717	126	29.42	263
16.9	38.858	187	49.32	227	56.906	189	27.01	241
26.9	39.084	226	46.99	233	57.154	248	24.93	208
Oct. 6.9	39.349	265	44.65	234	57.460	306	23.29	164
16.8	39.650	301	42.34	231	57.819	359	22.14	115
26.8	39.985	335	40.11	223	58.222	403	21.56	58
Nov. 5.8	40.351	366	38.01	210	58.661	439	21.60	4
15.8	40.742	391	36.10	191	59.123	462	22.26	66
25.7	41.147	405	34.44	166	59.596	473	23.56	130
Dec. 5.7	41.557	410	33.06	138	60.063	467	25.45	189
15.7	41.961	404	32.04	102	60.510	447	27.88	243
25.7	42.346	385	31.41	63	60.921	411	30.77	289
35.6	42.701	355	31.18	23	61.284	363	34.02	325
Mean Place	36.398		65.64		56.760		21.11	
Sec δ. Tan δ	1.334		+0.883		1.708		−1.385	
Dψ α, Dω α	+0.07		+0.05		+0.04		−0.08	
Dψ δ, Dω δ	−0.3		+0.5		−0.3		+0.5	

Washington Mean Time.	π Leonis. Mag. 4.9 Right Ascension.		Declination.		η Leonis. Mag. 3.[illegible] Right Ascension.		Declination.
	h m 9 55		° ′ + 8 26		h m 10 2		+1[illegible]
	s		″		s		″
Jan. 0.6	51.682		26.75		50.516		54.[illegible]
10.6	51.951	269	25.12	163	50.799	283	52.[illegible]
20.6	52.180	229	23.70	142	51.042	243	51.[illegible]
30.6	52.363	183	22.53	117	51.239	197	51.[illegible]
Feb. 9.5	52.498	135	21.61	92	51.386	147	50.[illegible]
19.5	52.580	82	20.96	65	51.482	96	50.[illegible]
Mar. 1.5	52.618	38	20.53	43	51.526	44	50.[illegible]
11.4	52.609	9	20.34	19	51.524	2	51.[illegible]
21.4	52.562	47	20.34	0	51.481	43	51.[illegible]
31.4	52.483	79	20.49	15	51.404	77	52.[illegible]
Apr. 10.4	52.380	103	20.78	29	51.300	104	52.[illegible]
20.3	52.261	119	21.15	37	51.179	121	53.4[illegible]
30.3	52.135	126	21.59	44	51.049	130	54.[illegible]
May 10.3	52.007	128	22.07	48	50.916	133	54.[illegible]
20.3	51.885	122	22.57	50	50.788	128	55.[illegible]
30.2	51.773	112	23.07	50	50.670	118	55.7[illegible]
June 9.2	51.675	98	23.56	49	50.565	105	56.[illegible]
19.2	51.594	81	24.03	47	50.476	89	56.34
29.1	51.533	61	24.46	43	50.409	67	56.4[illegible]
July 9.1	51.493	40	24.84	38	50.362	47	56.5[illegible]
19.1	51.476	17	25.15	31	50.340	22	56.40
29.1	51.483	7	25.37	22	50.342	2	56.15
Aug. 8.0	51.517	34	25.48	11	50.370	28	55.70
18.0	51.576	59	25.46	2	50.424	54	55.22
28.0	51.663	87	25.27	19	50.508	84	54.50
Sept. 7.0	51.779	116	24.91	36	50.622	114	53.[illegible]
16.9	51.925	146	24.35	56	50.766	144	52.55
26.9	52.102	177	23.55	80	50.943	177	51.29
Oct. 6.9	52.312	210	22.53	102	51.151	208	49.80
16.8	52.551	239	21.29	124	51.392	241	48.25
26.8	52.821	270	19.83	146	51.665	273	46.51
Nov. 5.8	53.115	294	18.17	166	51.964	299	44.66
15.8	53.429	314	16.37	180	52.284	320	42.75
25.7	53.756	327	14.46	191	52.619	335	40.82
Dec. 5.7	54.087	331	12.50	196	52.960	341	38.94
15.7	54.414	327	10.55	195	53.298	338	37.16
25.7	54.724	310	8.69	186	53.623	325	35.56
35.6	55.010	286	6.95	174	53.922	299	34.17
Mean Place	49.720		34.70		48.496		64.54
Sec δ. Tan δ	1.011		+0.148		1.047		+0.300
Dψ α, Dω α	+0.06		+0.01		+0.06		+0.0[illegible]
Dψ δ, Dω δ	−0.3		+0.5		−0.3		+0.[illegible]

FOR THE UPPER TRANSIT AT WASHINGTON.

gton Time.	α Leonis. (*Regulus.*) Mag. 1.3				λ Hydræ. Mag. 3.8				*q* Velorum. Mag. 4.1				32 Ursæ Majoris. Mag. 5.7			
	Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.	
	h m 10 3		° ′ +12 21		h m 10 6		° ′ −11 56		h m 10 11		° ′ −41 42		h m 10 12		° ′ +65 30	
	s		″		s		″		s		″		s		″	
0.6	59.183		74.71		34.292		38.47		16.664		32.10		5.19		62.69	
10.6	59.461	278	73.23	148	34.559	267	40.96	249	16.971	307	35.32	322	5.75	56	63.57	88
20.6	59.699	238	72.00	123	34.788	229	43.39	243	17.228	257	38.70	338	6.23	48	64.96	139
30.6	59.892	193	71.03	97	34.973	185	45.70	231	17.429	201	42.16	346	6.61	38	66.78	182
9.5	60.037	145	70.34	69	35.109	136	47.82	212	17.571	142	45.59	343	6.90	29	68.96	218
19.5	60.130	93	69.91	43	35.196	87	49.73	191	17.655	84	48.92	333	7.06	16	71.39	243
1.5	60.174	44	69.73	18	35.235	39	51.39	166	17.681	26	52.06	314	7.12	6	73.99	260
11.5	60.174	0	69.77	4	35.232	3	52.80	141	17.654	27	54.97	291	7.08	4	76.61	262
21.4	60.133	41	69.99	22	35.189	43	53.93	113	17.580	74	57.57	260	6.94	14	79.14	253
31.4	60.058	75	70.35	36	35.115	74	54.81	88	17.466	114	59.85	228	6.71	23	81.50	236
. 10.4	59.959	99	70.80	45	35.017	98	55.42	61	17.322	144	61.75	190	6.41	30	83.57	207
20.3	59.842	117	71.32	52	34.901	116	55.79	37	17.153	169	63.25	150	6.04	37	85.29	172
30.3	59.717	125	71.87	55	34.777	124	55.91	12	16.969	184	64.34	109	5.65	39	86.59	130
r 10.3	59.589	128	72.43	56	34.649	128	55.81	10	16.776	193	65.00	66	5.24	41	87.43	84
20.3	59.464	125	72.96	53	34.523	126	55.49	32	16.582	194	65.23	23	4.83	41	87.79	36
30.2	59.350	114	73.46	50	34.406	117	54.98	51	16.392	190	65.03	20	4.43	40	87.66	13
e 9.2	59.247	103	73.90	44	34.298	108	54.28	70	16.211	181	64.42	61	4.06	37	87.03	63
19.2	59.161	86	74.28	38	34.205	93	53.43	85	16.045	166	63.40	102	3.72	34	85.94	109
29.2	59.095	66	74.59	31	34.130	75	52.44	99	15.897	148	62.02	138	3.44	28	84.42	152
y 9.1	59.049	46	74.81	22	34.073	57	51.34	110	15.774	123	60.31	171	3.22	22	82.50	192
19.1	59.026	23	74.93	12	34.037	36	50.17	117	15.677	97	58.33	198	3.04	18	80.22	228
29.1	59.026	0	74.94	1	34.026	11	48.97	120	15.613	64	56.13	220	2.93	11	77.63	259
g. 8.0	59.052	26	74.83	11	34.039	13	47.80	117	15.583	30	53.79	234	2.89	4	74.81	282
18.0	59.103	51	74.56	27	34.079	40	46.69	111	15.592	9	51.40	239	2.92	3	71.78	303
28.0	59.184	81	74.13	43	34.148	69	45.70	99	15.643	51	49.03	237	3.04	12	68.62	316
pt. 7.0	59.294	110	73.53	60	34.248	100	44.90	80	15.739	96	46.78	225	3.21	17	65.38	324
16.9	59.433	139	72.72	81	34.381	133	44.32	58	15.881	142	44.76	202	3.46	25	62.12	326
26.9	59.605	172	71.72	100	34.547	166	44.04	28	16.071	190	43.04	172	3.78	32	58.90	322
t. 6.9	59.810	205	70.50	122	34.748	201	44.07	3	16.308	237	41.71	133	4.17	39	55.81	309
16.9	60.045	235	69.08	142	34.980	232	44.47	40	16.588	280	40.85	86	4.63	46	52.88	293
26.8	60.312	267	67.47	161	35.245	265	45.25	78	16.909	321	40.50	35	5.14	51	50.20	268
v. 5.8	60.605	293	65.72	175	35.536	291	46.39	114	17.264	355	40.71	21	5.72	58	47.82	238
15.8	60.920	315	63.85	187	35.849	313	47.89	150	17.644	380	41.50	79	6.34	62	45.83	199
25.7	61.249	329	61.91	194	36.175	326	49.71	182	18.038	394	42.84	134	6.99	65	44.29	154
ec. 5.7	61.584	335	59.97	194	36.506	331	51.80	209	18.435	397	44.71	187	7.65	66	43.23	106
15.7	61.916	332	58.08	189	36.832	326	54.09	229	18.822	387	47.06	235	8.30	65	42.70	53
25.7	62.234	318	56.31	177	37.143	311	56.51	242	19.186	364	49.81	275	8.93	63	42.73	3
35.6	62.527	293	54.72	159	37.429	286	58.99	248	19.517	331	52.88	307	9.52	59	43.30	57
n Place	57.221		83.99		32.504		35.89		14.886		37.28		1.438		82.84	
δ, Tan δ	1.024		+0.219		1.022		−0.212		1.340		−0.891		2.413		+2.198	
, D_a α	+0.06		+0.01		+0.06		−0.01		+0.05		−0.05		+0.09		+0.13	
D_a δ	−0.3		+0.5		−0.3		+0.5		−0.4		+0.5		−0.4		+0.5	

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FOR THE UPPER TRANSIT AT .

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eclina- tion.	
°	′
-30	38
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).04	
3.01	297
3.09	303
).17	306
2.18	301
	288
).06	
'.75	269
).20	245
3.35	215
.20	185
	151
).71	
4.88	117
'.69	81
3.15	46
3.25	10
	26
'.99	
'.39	60
5.49	90
.29	120
3.83	146
	168
2.15	
).32	183
.40	192
.45	195
.54	191
	177
'.77	
.22	155
.95	127
.04	91
.55	49
	2
.53	
.02	49
.99	97
.44	145
.34	190
	230
.64	
.26	262
.11	285
.55	
0.598	
−0.04	
+0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	36 Ursæ Majoris. Mag. 4.8 Right Ascension.	Diff.	36 Ursæ Majoris. Declination.	Diff.	9 H. Draconis. Mag. 5.0 Right Ascension.	Diff.	9 H. Draconis. Declination.	Diff.	ρ Leonis. Mag. 3.8 Right Ascension.	Diff.	ρ Leonis. Declination.	Diff.	33 Sex[tantis] Mag[.] Right Ascension.	Diff.
	h m		° ′		h m		° ′		h m		° ′		h m	
	10 25		+56 23		10 28		+76 7		10 28		+ 9 43		10 37	
	s		″		s		″		s		″		s	
Jan. 0.7	22.448		63.78		10.19		65.99		28.369		53.58		12.528	
10.6	22.900	452	64.16	38	11.11	92	67.07	108	28.659	290	51.91	167	12.817	289
20.6	23.295	395	65.03	87	11.90	79	68.68	161	28.914	255	50.46	145	13.072	255
30.6	23.621	326	66.36	133	12.55	65	70.77	209	29.128	214	49.27	119	13.287	215
Feb. 9.6	23.871	250	68.08	172	13.04	49	73.23	246	29.295	167	48.35	92	13.456	169
19.5	24.038	167	70.11	203	13.35	31	75.98	275	29.413	118	47.72	63	13.578	122
Mar. 1.5	24.120	82	72.34	223	13.46	11	78.88	290	29.483	70	47.35	37	13.653	75
11.5	24.120	0	74.67	233	13.40	6	81.81	293	29.506	23	47.23	12	13.684	31
21.4	24.045	75	77.00	233	13.15	25	84.64	283	29.489	17	47.31	8	13.674	10
31.4	23.904	141	79.23	223	12.76	39	87.26	262	29.438	51	47.57	26	13.632	42
Apr. 10.4	23.709	195	81.26	203	12.24	52	89.59	233	29.359	79	47.95	38	13.562	70
20.4	23.472	237	83.01	175	11.61	63	91.51	192	29.260	99	48.43	48	13.472	90
30.3	23.206	266	84.44	143	10.89	72	92.97	146	29.148	112	48.97	54	13.368	104
May 10.3	22.925	281	85.47	103	10.14	75	93.91	94	29.029	119	49.54	57	13.257	111
20.3	22.641	284	86.08	61	9.37	77	94.32	41	28.912	117	50.12	58	13.144	113
30.3	22.364	277	86.26	18	8.60	77	94.19	13	28.798	114	50.68	56	13.034	110
June 9.2	22.105	259	86.00	26	7.86	74	93.51	68	28.693	105	51.20	52	12.930	104
19.2	21.869	236	85.30	70	7.17	69	92.31	120	28.600	93	51.68	48	12.836	94
29.2	21.666	203	84.20	110	6.56	61	90.62	169	28.524	76	52.10	42	12.755	81
July 9.1	21.500	166	82.72	148	6.04	52	88.49	213	28.464	60	52.45	35	12.690	65
19.1	21.375	125	80.89	183	5.62	42	85.97	252	28.423	41	52.68	23	12.641	49
29.1	21.294	81	78.74	215	5.31	31	83.11	286	28.404	19	52.82	14	12.612	29
Aug. 8.1	21.260	34	76.33	241	5.11	20	79.97	314	28.407	3	52.84	2	12.604	8
18.0	21.276	16	73.69	264	5.04	7	76.63	334	28.435	28	52.71	13	12.621	17
28.0	21.343	67	70.88	281	5.10	6	73.13	350	28.489	54	52.41	30	12.663	42
Sept. 7.0	21.463	120	67.93	295	5.30	20	69.56	357	28.574	85	51.93	48	12.736	73
17.0	21.637	174	64.90	303	5.61	31	65.98	358	28.689	115	51.23	70	12.840	104
26.9	21.866	229	61.86	304	6.05	44	62.48	350	28.837	148	50.33	90	12.976	136
Oct. 6.9	22.151	285	58.85	301	6.62	57	59.11	337	29.018	181	49.19	114	13.148	172
16.9	22.488	337	55.94	291	7.31	69	55.94	317	29.235	217	47.85	134	13.356	208
26.8	22.876	388	53.19	275	8.11	80	53.06	288	29.484	249	46.28	157	13.596	240
Nov. 5.8	23.310	434	50.68	251	9.00	89	50.55	251	29.762	278	44.53	175	13.868	272
15.8	23.782	472	48.46	222	9.97	97	48.46	209	30.067	305	42.63	190	14.167	299
25.8	24.284	502	46.59	187	10.99	102	46.87	159	30.389	322	40.63	200	14.484	317
Dec. 5.7	24.801	517	45.16	143	12.04	105	45.82	105	30.722	333	38.59	204	14.813	329
15.7	25.319	518	44.20	96	13.10	106	45.37	45	31.056	334	36.57	202	15.144	331
25.7	25.823	504	43.75	45	14.13	103	45.50	13	31.381	325	34.63	194	15.466	322
35.7	26.298	475	43.82	7	15.10	97	46.24	74	31.685	304	32.85	178	15.768	302
Mean Place	19.572		83.75		4.749		88.04		26.559		62.93		10.837	
Sec δ, Tan δ	1.807		+1.505		4.173		+4.052		1.015		+0.171		1.000	
$D_\psi a$, $D_\omega a$	+0.08		+0.09		+0.10		+0.25		+0.06		+0.01		+0.06	
$D_\psi \delta$, $D_\omega \delta$	−0.4		+0.4		−0.4		+0.4		−0.4		+0.4		−0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

ı	41 Leonis Minoris. Mag. 5.0				θ Argus. Mag. 3.0				42 Leonis Minoris. Mag. 5.4				η Argus. Var. 1.6–6.6			
	Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	10 38		+23 36		10 39		−63 57		10 41		+31 6		10 41		−59 14	
	s		″		s		″		s		″		s		″	
.7	56.266	314	70.26	114	61.36	49	25.64	310	17.195	334	55.59	85	52.004	435	43.28	310
.6	56.580	281	69.12	81	61.85	41	28.74	344	17.529	296	54.74	46	52.439	372	46.38	344
.6	56.861	236	68.31	47	62.26	33	32.18	368	17.825	252	54.28	6	52.811	302	49.82	364
.6	57.097	189	67.84	11	62.59	24	35.86	383	18.077	201	54.22	31	53.113	223	53.46	377
.6	57.286	136	67.73	20	62.83	15	39.69	387	18.278	146	54.53	64	53.336	144	57.23	379
.5	57.422	84	67.93	48	62.98	6	43.56	384	18.424	89	55.17	92	53.480	68	61.02	374
.5	57.506	35	68.41	71	63.04	2	47.40	370	18.513	36	56.09	115	53.548	7	64.76	358
.5	57.541	11	69.12	87	63.02	11	51.10	348	18.549	12	57.24	128	53.541	74	68.34	337
.4	57.530	48	69.99	99	62.91	17	54.58	321	18.537	55	58.52	135	53.467	136	71.71	308
.4	57.482	82	70.98	104	62.74	23	57.79	287	18.482	89	59.87	136	53.331	187	74.79	274
).4	57.400	105	72.02	104	62.51	28	60.66	247	18.393	116	61.23	129	53.144	230	77.53	236
).4	57.295	122	73.06	97	62.23	32	63.13	203	18.277	134	62.52	117	52.914	263	79.89	192
).3	57.173	130	74.03	88	61.91	35	65.16	157	18.143	144	63.69	100	52.651	288	81.81	144
0.3	57.043	132	74.91	75	61.56	38	66.73	106	17.999	148	64.69	82	52.363	305	83.25	97
0.3	56.911	129	75.66	60	61.18	38	67.79	55	17.851	144	65.51	59	52.058	312	84.22	45
0.3	56.782	121	76.26	42	60.80	38	68.34	3	17.707	136	66.10	34	51.746	311	84.67	4
9.2	56.661	108	76.68	23	60.42	37	68.37	50	17.571	123	66.44	10	51.435	301	84.63	53
.9.2	56.553	93	76.91	5	60.05	35	67.87	99	17.448	107	66.54	17	51.134	285	84.10	101
9.2	56.460	75	76.96	15	59.70	32	66.88	145	17.341	88	66.37	41	50.849	260	83.09	147
9.1	56.385	55	76.81	34	59.38	28	65.43	188	17.253	65	65.96	67	50.589	226	81.62	187
19.1	56.330	32	76.47	53	59.10	23	63.55	225	17.188	42	65.29	90	50.363	185	79.75	222
29.1	56.298	10	75.94	74	58.87	18	61.30	256	17.146	15	64.39	113	50.178	137	77.53	250
8.1	56.288	18	75.20	92	58.69	11	58.74	276	17.131	12	63.26	134	50.041	80	75.03	269
18.0	56.306	46	74.28	113	58.58	2	55.98	288	17.143	44	61.92	156	49.961	18	72.34	279
28.0	56.352	77	73.15	132	58.56	5	53.10	289	17.187	75	60.36	174	49.943	51	69.55	279
7.0	56.429	110	71.83	150	58.61	14	50.21	279	17.262	112	58.62	192	49.994	123	66.76	268
17.0	56.539	143	70.33	168	58.75	22	47.42	258	17.374	149	56.70	208	50.117	197	64.08	246
26.9	56.682	181	68.65	184	58.97	31	44.84	225	17.523	186	54.62	219	50.314	273	61.62	213
6.9	56.863	218	66.81	199	59.28	39	42.59	183	17.709	225	52.43	229	50.587	341	59.49	172
16.9	57.081	253	64.82	209	59.67	46	40.76	134	17.934	264	50.14	234	50.928	406	57.77	122
26.8	57.334	285	62.73	215	60.13	53	39.42	76	18.198	299	47.80	234	51.334	460	56.55	64
5.8	57.619	315	60.58	216	60.66	57	38.66	14	18.497	328	45.46	228	51.794	502	55.91	2
15.8	57.934	336	58.42	212	61.23	61	38.52	52	18.825	353	43.18	215	52.296	529	55.89	60
25.8	58.270	352	56.30	202	61.84	61	39.04	115	19.178	368	41.03	198	52.825	539	56.49	123
5.7	58.622	353	54.28	184	62.45	59	40.19	176	19.546	372	39.05	172	53.364	532	57.72	183
15.7	58.975	346	52.44	160	63.04	57	41.95	233	19.918	366	37.33	142	53.896	507	59.55	238
25.7	59.321	329	50.84	133	63.61	52	44.28	281	20.284	346	35.91	106	54.403	466	61.93	283
35.7	59.650		49.51		64.13		47.09		20.630		34.85		54.869		64.76	
'lace	54.375		83.92		59.488		35.70		15.213		71.33		50.234		52.58	
Tan δ	*1.091*		*+0.437*		*2.278*		*−2.047*		1.168		+0.604		1.956		−1.681	
, α	*+0.07*		*+0.03*		*+0.04*		−0.13		+0.07		+0.04		+0.05		−0.11	
δ	*−0.4*		*+0.3*		*−0.4*		*+0.3*		−0.4		+0.3		−0.4		+0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

gton Time.	46 Leonis Minoris. Mag. 3.9				54 Leonis. Mag. 4.5				ι Antliæ. Mag. 4.7				Groombridge 1706. Mag. 6.3			
	Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.	
	h m 10 48		° ′ +34 39		h m 10 51		° ′ +25 10		h m 10 52		° ′ −36 41		h m 10 53		° ′ +78 12	
	s		″		s		″		s		″		s		″	
0.7	42.459	348	28.78	76	9.150	325	79.35	115	52.647	334	24.65	291	26.65	109	30.81	82
10.6	42.807	311	28.02	35	9.475	291	78.20	80	52.981	293	27.56	311	27.74	98	31.63	141
20.6	43.118	266	27.67	8	9.766	250	77.40	44	53.274	246	30.67	319	28.72	83	33.04	192
30.6	43.384	214	27.75	46	10.016	202	76.96	7	53.520	196	33.86	320	29.55	65	34.96	234
9.6	43.598	159	28.21	81	10.218	150	76.89	27	53.716	141	37.06	312	30.20	46	37.30	269
19.5	43.757	101	29.02	111	10.368	98	77.16	55	53.857	88	40.18	298	30.66	24	39.99	291
r. 1.5	43.858	44	30.13	132	10.466	48	77.71	81	53.945	37	43.16	279	30.90	2	42.90	299
11.5	43.902	6	31.45	147	10.514	2	78.52	97	53.982	9	45.95	253	30.92	17	45.89	295
21.5	43.896	50	32.92	154	10.516	40	79.49	110	53.973	50	48.48	224	30.75	38	48.84	281
31.4	43.846	89	34.46	152	10.476	73	80.59	115	53.923	84	50.72	194	30.37	54	51.65	254
r. 10.4	43.757	117	35.98	144	10.403	97	81.74	114	53.839	109	52.66	158	29.83	67	54.19	218
20.4	43.640	138	37.42	131	10.306	118	82.88	109	53.730	131	54.24	122	29.16	80	56.37	173
30.3	43.502	151	38.73	110	10.188	128	83.97	98	53.599	146	55.46	84	28.36	87	58.10	125
y 10.3	43.351	156	39.83	88	10.060	131	84.95	83	53.453	155	56.30	47	27.49	92	59.35	73
20.3	43.195	154	40.71	62	9.929	131	85.78	66	53.298	158	56.77	8	26.57	93	60.08	16
30.3	43.041	147	41.33	34	9.798	125	86.44	48	53.140	157	56.85	29	25.64	91	60.24	39
ne 9.2	42.894	135	41.67	6	9.673	114	86.92	26	52.983	150	56.56	66	24.73	87	59.85	95
19.2	42.759	118	41.73	24	9.559	102	87.18	6	52.833	141	55.90	100	23.86	80	58.90	146
29.2	42.641	101	41.49	51	9.457	85	87.24	15	52.692	126	54.90	132	23.06	72	57.44	195
ly 9.2	42.540	77	40.98	79	9.372	65	87.09	38	52.566	107	53.58	159	22.34	61	55.49	236
19.1	42.463	53	40.19	105	9.307	45	86.71	58	52.459	87	51.99	181	21.73	49	53.13	275
29.1	42.410	26	39.14	130	9.262	21	86.13	81	52.372	58	50.18	198	21.24	35	50.38	308
ug. 8.1	42.384	2	37.84	154	9.241	4	85.32	100	52.314	28	48.20	207	20.89	23	47.30	332
18.0	42.386	35	36.30	175	9.245	33	84.32	122	52.286	8	46.13	208	20.66	8	43.98	352
28.0	42.421	68	34.55	195	9.278	64	83.10	142	52.294	47	44.05	203	20.58	8	40.46	364
ept. 7.0	42.489	105	32.60	213	9.342	96	81.68	161	52.341	92	42.02	186	20.66	22	36.82	370
17.0	42.594	143	30.47	228	9.438	132	80.07	179	52.433	136	40.16	163	20.88	38	33.12	366
26.9	42.737	183	28.19	238	9.570	170	78.28	195	52.569	184	38.53	130	21.26	54	29.46	355
ct. 6.9	42.920	225	25.81	245	9.740	207	76.33	210	52.753	230	37.23	91	21.80	67	25.91	339
16.9	43.145	264	23.36	249	9.947	245	74.23	219	52.983	274	36.32	45	22.47	81	22.52	313
26.9	43.409	301	20.87	247	10.192	279	72.04	225	53.257	315	35.87	4	23.28	94	19.39	280
ov. 5.8	43.710	333	18.40	238	10.471	311	69.79	226	53.572	346	35.91	56	24.22	106	16.59	238
15.8	44.043	361	16.02	222	10.782	335	67.53	220	53.918	372	36.47	109	25.28	113	14.21	191
25.8	44.404	376	13.80	200	11.117	352	65.33	207	54.290	383	37.56	158	26.41	118	12.30	135
Dec. 5.7	44.780	383	11.80	172	11.469	357	63.26	190	54.673	385	39.14	204	27.59	121	10.95	77
15.7	45.163	378	10.08	139	11.826	352	61.36	164	55.058	373	41.18	243	28.80	120	10.18	16
25.7	45.541	362	8.69	100	12.178	336	59.72	135	55.431	351	43.61	276	30.00	115	10.02	46
35.7	45.903		7.69		12.514		58.37		55.782		46.37		31.15		10.48	
ean Place	40.473		45.71		7.318		93.92		51.107		28.88		21.248		54.54	
c δ, Tan δ	1.216		+0.691		1.105		+0.470		1.247		−0.745		4.894		+4.790	
α, $D_\omega \alpha$	+0.07		+0.04		+0.07		+0.03		+0.06		−0.05		+0.10		+0.31	
δ, $D_\omega \delta$	−0.4		+0.3		−0.4		+0.3		−0.4		+0.3		−0.4		+0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	α Crateris. Mag. 4.2 Right Ascension.		α Crateris. Declination.		δ Leonis. Mag. 5.0 Right Ascension.		δ Leonis. Declination.		β Ursæ Majoris. Mag. 2.4 Right Ascension.		β Ursæ Majoris. Declination.		α Ursæ M[ajoris] Mag. [2] Right Ascension.	
	h m 10 55		° ′ −17 51		h m 10 56		° ′ + 4 3		h m 10 56		° ′ +56 48		h m 10 58	
	s		″		s		″		s		″		s	
Jan. 0.7	45.271	304	25.59	258	18.100	302	39.73	196	53.125	479	77.52	5	39.93	55
10.7	45.575	271	28.17	259	18.402	271	37.77	178	53.604	432	77.57	59	40.48	49
20.6	45.846	232	30.76	253	18.673	234	35.99	155	54.036	371	78.16	109	40.97	42
30.6	46.078	186	33.29	243	18.907	189	34.44	129	54.407	300	79.25	155	41.39	33
Feb. 9.6	46.264	137	35.72	226	19.096	143	33.15	102	54.707	219	80.80	192	41.72	25
19.5	46.401	91	37.98	204	19.239	96	32.13	75	54.926	136	82.72	221	41.97	16
Mar. 1.5	46.492	47	40.02	180	19.335	52	31.38	49	55.062	53	84.93	238	42.13	6
11.5	46.539	5	41.82	154	19.387	11	30.89	24	55.115	23	87.31	245	42.19	5
21.5	46.544	31	43.36	129	19.398	26	30.65	5	55.092	95	89.76	241	42.14	12
31.4	46.513	60	44.65	100	19.372	54	30.60	14	54.997	156	92.17	227	42.02	19
Apr. 10.4	46.453	82	45.65	73	19.318	77	30.74	29	54.841	205	94.44	204	41.83	25
20.4	46.371	100	46.38	48	19.241	93	31.03	39	54.636	241	96.48	174	41.58	30
30.4	46.271	110	46.86	21	19.148	103	31.42	48	54.395	268	98.22	139	41.28	32
May 10.3	46.161	118	47.07	3	19.045	108	31.90	54	54.127	280	99.61	96	40.96	35
20.3	46.043	118	47.04	28	18.937	108	32.44	57	53.847	283	100.57	53	40.61	35
30.3	45.925	114	46.76	49	18.829	104	33.01	59	53.564	275	101.10	9	40.26	34
June 9.2	45.811	110	46.27	71	18.725	97	33.60	58	53.289	258	101.19	37	39.92	32
19.2	45.701	101	45.56	89	18.628	87	34.18	57	53.031	237	100.82	81	39.60	30
29.2	45.600	88	44.67	105	18.541	73	34.75	53	52.794	206	100.01	123	39.30	27
July 9.2	45.512	72	43.62	119	18.468	59	35.28	48	52.588	171	98.78	163	39.03	22
19.1	45.440	55	42.43	127	18.409	41	35.76	40	52.417	133	97.15	198	38.81	17
29.1	45.385	33	41.16	130	18.368	21	36.16	30	52.284	89	95.17	229	38.64	12
Aug. 8.1	45.352	10	39.86	130	18.347	0	36.46	16	52.195	43	92.88	258	38.52	7
18.1	45.342	19	38.56	123	18.347	27	36.62	2	52.152	6	90.30	281	38.45	1
28.0	45.361	49	37.33	110	18.374	54	36.64	17	52.158	59	87.49	300	38.44	5
Sept. 7.0	45.410	85	36.23	92	18.428	86	36.47	37	52.217	114	84.49	312	38.49	12
17.0	45.495	120	35.31	66	18.514	120	36.10	62	52.331	171	81.37	319	38.61	19
26.9	45.615	160	34.65	36	18.634	155	35.48	85	52.502	231	78.18	320	38.80	25
Oct. 6.9	45.775	200	34.29	3	18.789	191	34.63	111	52.733	288	74.98	316	39.05	33
16.9	45.975	236	34.26	37	18.980	227	33.52	136	53.021	345	71.82	302	39.38	39
26.9	46.211	272	34.63	76	19.207	261	32.16	161	53.366	398	68.80	284	39.77	45
Nov. 5.8	46.483	302	35.39	116	19.468	290	30.55	181	53.764	446	65.96	257	40.22	50
15.8	46.785	325	36.55	154	19.758	314	28.74	197	54.210	484	63.39	222	40.72	55
25.8	47.110	338	38.09	186	20.072	328	26.77	210	54.694	508	61.17	180	41.27	57
Dec. 5.8	47.448	342	39.95	216	20.400	333	24.67	214	55.202	522	59.37	134	41.84	59
15.7	47.790	336	42.11	236	20.733	329	22.53	210	55.724	517	58.03	82	42.43	59
25.7	48.126	318	44.47	252	21.062	314	20.43	203	56.241	496	57.21	28	43.02	56
35.7	48.444		46.99		21.376		18.40		56.737		56.93		43.58	
Mean Place	43.737		24.26		16.480		48.08		50.595		99.35		37.132	
Sec δ, Tan δ	1.051		−0.322		1.003		+0.071		1.827		+1.529		2.144	
$D_\psi \alpha$, $D_\omega \alpha$	+0.06		−0.02		+0.06		0.00		+0.07		+0.10		+0.07	
$D_\psi \delta$, $D_\omega \delta$	−0.4		+0.3		−0.4		+0.3		−0.4		+0.3		−0.4	

FOR THE UPPER TRANSIT AT .

FOR THE UPPER TRANSIT AT

Washington Mean Time.	δ Leonis. Mag. 2.6 Right Ascension.		De[…]
	h m 11 9		+2[…]
	s		″
Jan. 0.7	43.491	327	29.
10.7	43.818	296	27.
20.6	44.114	258	26.
30.6	44.372	214	25.
Feb. 9.6	44.586	165	25.
19.6	44.751	116	25.
Mar. 1.5	44.867	68	25.
11.5	44.935	22	26.
21.5	44.957	−18	26.
31.4	44.939	50	27.
Apr. 10.4	44.889	78	28.
20.4	44.811	97	29.
30.4	44.714	111	30.
May 10.3	44.603	119	31.
20.3	44.484	121	32.
30.3	44.363	117	33.
June 9.3	44.246	111	34.
19.2	44.135	102	34.
29.2	44.033	90	34.
July 9.2	43.943	73	34.
19.1	43.870	57	34.
29.1	43.813	37	34.
Aug. 8.1	43.776	12	33.
18.1	43.764	14	33.
28.0	43.778	41	32.
Sept. 7.0	43.819	75	30.
17.0	43.894	110	29.
27.0	44.004	147	27.
Oct. 6.9	44.151	185	26.
16.9	44.336	225	24.
26.9	44.561	262	22.
Nov. 5.8	44.823	294	19.
15.8	45.117	321	17.
25.8	45.438	339	15.
Dec. 5.8	45.777	349	13.
15.7	46.126	349	11.
25.7	46.475	336	9.
35.7	46.811		7.
Mean Place	44.824		43.
Sec δ, Tan δ	1.071		+0.
$D_\psi\alpha$, $D_\omega\alpha$	+0.06		+0.
$D_\psi\delta$, $D_\omega\delta$	−0.4		+0.2

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	λ Draconis. Mag. 4.1 Right Ascension.		λ Draconis. Declination.		ξ Hydræ. Mag. 3.7 Right Ascension.		ξ Hydræ. Declination.		λ Centauri. Mag. 3.3 Right Ascension.		λ Centauri. Declination.		υ Leo Mag. 4 Right Ascension.	
	h m		° ′		h m		° ′		h m		° ′		h m	
	11 26		+69 46		11 28		−31 23		11 31		−62 33		11 32	
	s		″		s		″		s		″		s	
Jan. 0.7	32.52		56.70		56.346		51.29		58.05		27.40		43.336	
10.7	33.24	72	56.84	14	56.690	344	53.93	264	58.59	54	29.97	257	43.654	318
20.6	33.91	67	57.58	74	57.004	314	56.73	280	59.07	48	32.95	298	43.945	291
30.6	34.50	59	58.89	131	57.279	275	59.62	289	59.49	42	36.25	330	44.203	258
Feb. 9.6	34.98	48	60.72	183	57.509	230	62.53	291	59.84	35	39.81	356	44.422	219
19.6	35.36	38	62.98	226	57.690	181	65.37	284	60.11	27	43.49	368	44.598	176
Mar. 1.5	·35.62	26	65.56	258	57.823	133	68.09	272	60.30	19	47.22	373	44.730	132
11.5	35.75	13	68.35	279	57.907	84	70.62	253	60.41	11	50.92	370	44.818	88
21.5	35.75	0	71.22	287	57.947	40	72.95	233	60.44	3	54.49	357	44.866	48
31.5	35.63	12	74.07	285	57.948	1	75.01	206	60.40	4	57.88	339	44.877	11
Apr. 10.4	35.42	21	76.77	270	57.913	35	76.81	180	60.29	11	61.02	314	44.856	21
20.4	35.11	31	79.22	245	57.849	64	78.31	150	60.13	16	63.84	282	44.810	46
30.4	34.73	38	81.33	211	57.762	87	79.49	118	59.92	21	66.30	246	44.743	67
May 10.3	34.28	45	83.03	170	57.657	105	80.36	87	59.67	25	68.35	205	44.662	81
20.3	33.80	48	84.26	123	57.537	120	80.90	54	59.38	29	69.95	160	44.571	91
30.3	33.30	50	85.00	74	57.409	128	81.11	21	59.07	31	71.07	112	44.474	97
June 9.3	32.80	50	85.21	21	57.276	133	81.00	11	58.74	33	71.69	62	44.374	100
19.2	32.30	50	84.90	31	57.142	134	80.57	43	58.40	34	71.81	12	44.275	99
29.2	31.82	48	84.07	83	57.011	131	79.83	74	58.07	33	71.43	38	44.180	95
July 9.2	31.39	43	82.74	133	56.888	123	78.82	101	57.74	33	70.55	88	44.092	88
19.2	31.00	39	80.95	179	56.775	113	77.55	127	57.43	31	69.21	134	44.013	79
29.1	30.66	34	78.73	222	56.676	99	76.08	147	57.16	27	67.46	175	43.948	65
Aug. 8.1	30.39	27	76.13	260	56.598	78	74.43	165	56.93	23	65.32	214	43.897	51
18.1	30.20	19	73.21	292	56.544	54	72.70	173	56.74	19	62.89	243	43.866	31
28.0	30.08	12	70.02	319	56.520	24	70.93	177	56.62	12	60.24	265	43.856	10
Sept. 7.0	30.05	3	66.62	340	56.530	10	69.19	174	56.57	5	57.48	276	43.875	19
17.0	30.10	5	63.07	355	56.578	48	67.57	162	56.60	3	54.69	279	43.923	48
27.0	30.24	14	59.44	363	56.670	92	66.14	143	56.73	13	51.99	270	44.006	83
Oct. 6.9	30.47	23	55.81	363	56.808	138	64.98	116	56.93	20	49.50	249	44.126	120
16.9	30.80	33	52.27	354	56.993	185	64.16	82	57.22	29	47.33	217	44.285	159
26.9	31.23	43	48.86	341	57.224	231	63.74	42	57.59	37	45.56	177	44.484	199
Nov. 5.9	31.74	51	45.70	316	57.498	274	63.75	1	58.04	45	44.28	128	44.720	236
15.8	32.33	59	42.85	285	57.811	313	64.23	48	58.55	51	43.56	72	44.992	272
25.8	32.99	66	40.40	245	58.154	343	65.18	95	59.12	57	43.45	11	45.292	300
Dec. 5.8	33.70	71	38.43	197	58.517	363	66.57	139	59.70	58	43.97	52	45.612	320
15.7	34.44	74	37.00	143	58.890	373	68.39	182	60.30	60	45.09	112	45.944	332
25.7	35.19	75	36.15	85	59.260	370	70.57	218	60.88	58	46.81	172	46.278	334
35.7	35.93	74	35.92	23	59.616	356	73.05	248	61.45	57	49.06	225	46.603	325
Mean Place	29.629		81.55		55.004		54.02		56.642		37.87		41.941	
Sec δ, Tan δ	2.894		+2.716		1.172		−0.610		2.170		−1.926		1.000	
$D_\psi a$, $D_\omega a$	+0.07		+0.18		+0.06		−0.04		+0.05		−0.13		+0.06	
$D_\psi \delta$, $D_\omega \delta$	−0.4		+0.1		−0.4		+0.1		−0.4		+0.1		−0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

ngton Time.	π Chamæleontis. Mag. 5.7 Right Ascension.		Declination.		8 Draconis. Mag. 5.5 Right Ascension.		Declination.		ζ Crateris. Mag. 4.9 Right Ascension.		Declination.		χ Ursæ Majoris. Mag. 3.8 Right Ascension.		Declination.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	11 33		−75 26		11 37		+67 11		11 40		−17 53		11 41		+48 13	
	s		″		s		″		s		″		s		″	
0.7	51.35		1.09		53.86		50.55		34.527		22.95		42.205		60.65	
		90		236		66		9		329		243		431		75
10.7	52.25		3.45		54.52		50.46	—	34.856		25.38		42.636		59.90	
		81		285		61		53		303		248		402		20
20.7	53.06		6.30		55.13		50.99		35.159		27.86		43.038		59.70	—
		70		324		55		111		269		246		360		33
30.6	53.76		9.54		55.68		52.10		35.428		30.32		43.398		60.03	
		56		356		46		164		229		236		308		84
9.6	54.32		13.10		56.14		53.74		35.657		32.68		43.706		60.87	
		44		375		37		210		187		223		248		130
19.6	54.76		16.85		56.51		55.84		35.844		34.91		43.954		62.17	
		29		388		26		245		141		203		182		169
1.5	55.05		20.73		56.77		58.29		35.985		36.94		44.136		63.86	
		15		390		15		270		97		182		118		197
11.5	55.20		24.63		56.92		60.99		36.082		38.76		44.254		65.83	
		1		384		4		282		55		157		53		218
21.5	55.21	—	28.47		56.96	—	63.81		36.137		40.33		44.307	—	68.01	
		11		371		7		284		19		134		8		228
31.5	55.10		32.18		56.89		66.65		36.156	—	41.67		44.299		70.29	
		23		348		16		273		15		108		62		228
10.4	54.87		35.66		56.73		69.38		36.141		42.75		44.237		72.57	
		36		319		25		251		41		83		107		217
20.4	54.51		38.85		56.48		71.89		36.100		43.58		44.130		74.74	
		44		285		31		221		63		58		146		200
30.4	54.07		41.70		56.17		74.10		36.037		44.16		43.986		76.74	
		54		243		37		183		80		35		174		174
10.4	53.53		44.13		55.80		75.93		35.957		44.51		43.812		78.48	
		57		199		41		139		92		11		193		144
20.3	52.96		46.12		55.39		77.32		35.865		44.62	—	43.619		79.92	
		65		149		43		91		101		11		205		108
30.3	52.31		47.61		54.96		78.23		35.764		44.51		43.414		81.00	
		69		97		44		41		106		32		210		69
e 9.3	51.62		48.58		54.52		78.64	—	35.658		44.19		43.204		81.69	
		71		42		44		11		108		51		208		28
19.2	50.91		49.00	—	54.08		78.53		35.550		43.68		42.996		81.97	—
		71		12		42		62		106		71		201		13
29.2	50.20		48.88		53.66		77.91		35.444		42.97		42.795		81.84	
		69		65		39		112		102		85		187		54
r 9.2	49.51		48.23		53.27		76.79		35.342		42.12		42.608		81.30	
		65		118		36		159		93		98		168		93
19.2	48.86		47.05		52.91		75.20		35.249		41.14		42.440		80.37	
		59		167		31		203		82		109		147		132
29.1	48.27		45.38		52.60		73.17		35.167		40.05		42.293		79.05	
		51		210		26		243		66		115		120		169
g. 8.1	47.76		43.28		52.34		70.74		35.101		38.90		42.173		77.36	
		41		246		20		276		47		117		88		202
18.1	47.35		40.82		52.14		67.98		35.054		37.73		42.085		75.34	
		28		274		12		306		22		114		54		230
28.1	47.07		38.08		52.02		64.92		35.032	—	36.59		42.031		73.04	
		15		293		6		330		6		105		14		258
pt. 7.0	46.92		35.15		51.96	—	61.62		35.038		35.54		42.017	—	70.46	
		1		301		2		348		40		91		30		278
17.0	46.91	—	32.14		51.98		58.14		35.078		34.63		42.047		67.68	
		17		297		10		357		77		69		78		296
27.0	47.08		29.17		52.08		54.57		35.155		33.94		42.125		64.72	
		32		282		19		362		117		44		128		310
t. 6.9	47.40		26.35		52.27		50.95		35.272		33.50		42.253		61.62	
		47		255		27		358		160		13		182		315
16.9	47.87		23.80		52.54		47.37		35.432		33.37	—	42.435		58.47	
		63		216		35		345		202		22		236		315
26.9	48.50		21.64		52.89		43.92		35.634		33.59		42.671		55.32	
		75		168		45		327		242		58		288		307
ov. 5.9	49.25		19.96		53.34		40.65		35.876		34.17		42.959		52.25	
		86		113		51		297		279		95		337		293
15.8	50.11		18.83		53.85		37.68		36.155		35.12		43.296		49.32	
		94		51		58		259		311		132		378		269
25.8	51.05		18.32	—	54.43		35.09		36.466		36.44		43.674		46.63	
		99		13		63		216		332		166		412		239
ec. 5.8	52.04		18.45		55.06		32.93		36.798		38.10		44.086		44.24	
		101		78		67		164		345		195		434		200
15.8	53.05		19.23		55.73		31.29		37.143		40.05		44.520		42.24	
		100		142		68		106		345		220		443		156
25.7	54.05		20.65		56.41		30.23		37.488		42.25		44.963		40.68	
		94		201		67		46		339		235		437		105
35.7	54.99		22.66		57.08		29.77		37.827		44.60		45.400		39.63	
n Place	49.733		13.46		51.393		75.59		33.229		21.29		40.449		82.74	
δ, Tan δ	*3.978*		*−3.850*		*2.580*		*+2.379*		1.051		−0.323		1.501		+1.120	
; $D_w\alpha$	*+0.05*		*−0.25*		*+0.07*		*+0.16*		+0.06		−0.02		+0.06		+0.07	
$D_w\delta$	*−0.4*		*+0.1*		*−0.4*		*+0.1*		−0.4		+0.1		−0.4		+0.1	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	β Leonis. (*Denebola*.) Mag. 2.2 Right Ascension.		β Leonis. Declination.		β Virginis. Mag. 3.8 Right Ascension.		β Virginis. Declination.		Groombridge 1830. Mag. 6.5 Right Ascension.		Groombridge 1830. Declination.		γ Ursæ Mag. Right Ascension.	
	h m		° ′		h m		° ′		h m		° ′		h m	
	11 44		+15 1		11 46		+ 2 13		11 48		+38 18		11 49	
	s		″		s		″		s		″		s	
Jan. 0.7	51.049	329	56.95	177	23.638	324	48.49	208	13.562	392	32.15	128	30.139	478
10.7	51.378	306	55.18	149	23.962	300	46.41	193	13.954	369	30.87	80	30.617	448
20.7	51.684	275	53.69	116	24.262	270	44.48	170	14.323	333	30.07	30	31.065	405
30.6	51.959	237	52.53	81	24.532	233	42.78	147	14.656	289	29.77	17	31.470	349
Feb. 9.6	52.196	192	51.72	48	24.765	190	41.31	118	14.945	237	29.94	61	31.819	283
19.6	52.388	147	51.24	13	24.955	146	40.13	91	15.182	181	30.55	101	32.102	213
Mar. 1.6	52.535	101	51.11	17	25.101	104	39.22	62	15.363	126	31.56	132	32.315	137
11.5	52.636	59	51.28	41	25.205	63	38.60	37	15.489	72	32.88	157	32.452	65
21.5	52.695	18	51.69	64	25.268	25	38.23	12	15.561	22	34.45	172	32.517	6
31.5	52.713	15	52.33	79	25.293	6	38.11	7	15.583	24	36.17	177	32.511	67
Apr. 10.4	52.698	43	53.12	90	25.287	34	38.18	24	15.559	63	37.94	174	32.444	122
20.4	52.655	68	54.02	94	25.253	55	38.42	37	15.496	93	39.68	164	32.322	167
30.4	52.587	84	54.96	95	25.198	72	38.79	48	15.403	118	41.32	147	32.155	203
May 10.4	52.503	96	55.91	91	25.126	84	39.27	55	15.285	135	42.79	124	31.952	228
20.3	52.407	104	56.82	85	25.042	92	39.82	59	15.150	146	44.03	97	31.724	245
30.3	52.303	108	57.67	74	24.950	96	40.41	62	15.004	151	45.00	65	31.479	253
June 9.3	52.195	108	58.41	62	24.854	97	41.03	62	14.853	150	45.65	32	31.226	253
19.3	52.087	105	59.03	49	24.757	96	41.65	61	14.703	146	45.97	1	30.973	246
29.2	51.982	99	59.52	33	24.661	91	42.26	58	14.557	137	45.96	37	30.727	232
July 9.2	51.883	90	59.85	16	24.570	83	42.84	52	14.420	123	45.59	72	30.495	212
19.2	51.793	79	60.01	1	24.487	72	43.36	45	14.297	108	44.87	105	30.283	189
29.1	51.714	62	60.00	20	24.415	59	43.81	36	14.189	87	43.82	138	30.094	157
Aug. 8.1	51.652	45	59.80	39	24.356	42	44.17	23	14.102	62	42.44	170	29.937	121
18.1	51.607	21	59.41	61	24.314	19	44.40	10	14.040	33	40.74	199	29.816	82
28.1	51.586	4	58.80	82	24.295	6	44.50	8	14.007	2	38.75	224	29.734	38
Sept. 7.0	51.590	35	57.98	104	24.301	37	44.42	28	14.005	36	36.51	249	29.696	12
17.0	51.625	69	56.94	128	24.338	71	44.14	51	14.041	76	34.02	267	29.708	66
27.0	51.694	107	55.66	149	24.409	107	43.63	76	14.117	120	31.35	285	29.774	123
Oct. 7.0	51.801	147	54.17	172	24.516	148	42.87	101	14.237	167	28.50	297	29.897	184
16.9	51.948	187	52.45	190	24.664	187	41.86	129	14.404	214	25.53	303	30.081	244
26.9	52.135	227	50.55	209	24.851	227	40.57	152	14.618	261	22.50	304	30.325	303
Nov. 5.9	52.362	265	48.46	220	25.078	263	39.05	176	14.879	304	19.46	299	30.628	359
15.8	52.627	297	46.26	228	25.341	295	37.29	194	15.183	343	16.47	284	30.987	408
25.8	52.924	320	43.98	228	25.636	317	35.35	210	15.526	372	13.63	261	31.395	447
Dec. 5.8	53.244	336	41.70	223	25.953	332	33.25	218	15.898	395	11.02	233	31.842	473
15.8	53.580	341	39.47	210	26.285	336	31.07	218	16.293	403	8.69	197	32.315	487
25.7	53.921	335	37.37	190	26.621	330	28.89	214	16.696	396	6.72	154	32.802	484
35.7	54.256		35.47		26.951		26.75		17.092		5.18		33.286	
Mean Place	49.653		69.92		22.311		57.16		12.010		52.10		28.353	
Sec δ, Tan δ	1.035		+0.268		1.001		+0.039		1.274		+0.790		1.707	
$D_\psi a$, $D_\omega a$	+0.06		+0.02		+0.06		0.00		+0.06		+0.05		+0.06	
$D_\psi \delta$, $D_\omega \delta$	−0.4		+0.1		−0.4		+0.1		−0.4		+0.1		−0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

...gton Time.	π Virginis. Mag. 4.6 Right Ascension.		Declination.		ο Virginis. Mag. 4.2 Right Ascension.		Declination.		δ Centauri. Mag. 2.9 Right Ascension.		Declination.		ε Corvi. Mag. 3.2 Right Ascension.		Declination.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	11 56		+ 7 4		12 0		+ 9 11		12 4		−50 15		12 5		−22 9	
	s		″		s		″		s		″		s		″	
0.7	38.464		27.24		60.174		26.68		4.108		29.24		52.358		30.00	
10.7	38.792	328	25.24	200	60.504	330	24.72	196	4.555	447	31.57	233	52.702	344	32.36	236
20.7	39.098	306	23.46	178	60.812	308	23.00	172	4.971	416	34.27	270	53.025	323	34.81	245
30.6	39.376	278	21.94	152	61.093	281	21.55	145	5.345	374	37.25	298	53.317	292	37.30	249
9.6	39.616	240	20.70	124	61.337	244	20.41	114	5.668	323	40.42	317	53.571	254	39.76	246
19.6	39.815	199	19.76	94	61.541	204	19.59	82	5.936	268	43.70	328	53.784	213	42.11	235
1.6	39.971	156	19.14	62	61.701	160	19.10	49	6.146	210	47.02	332	53.954	170	44.33	222
11.5	40.085	114	18.82	32	61.818	117	18.89	21	6.296	150	50.30	328	54.080	126	46.35	202
21.5	40.157	72	18.76	6	61.894	76	18.96	7	6.391	95	53.47	317	54.165	85	48.15	180
31.5	40.190	33	18.94	18	61.931	37	19.28	32	6.434	43	56.46	299	54.212	47	49.74	159
10.5	40.191	1	19.30	36	61.935	4	19.77	49	6.428	6	59.24	278	54.224	12	51.08	134
20.4	40.162	29	19.82	52	61.909	26	20.40	63	6.379	49	61.74	250	54.206	18	52.17	109
30.4	40.112	50	20.45	63	61.861	48	21.15	75	6.291	88	63.94	220	54.164	42	53.02	85
10.4	40.043	69	21.15	70	61.793	68	21.94	79	6.170	121	65.78	184	54.101	63	53.61	59
20.3	39.960	83	21.87	72	61.711	82	22.75	81	6.022	148	67.23	145	54.021	80	53.96	35
30.3	39.868	92	22.61	74	61.619	92	23.54	79	5.850	172	68.29	106	53.929	92	54.07	11
e 9.3	39.771	97	23.31	70	61.521	98	24.29	75	5.661	189	68.93	64	53.826	103	53.95	12
19.3	39.671	100	23.97	66	61.420	101	24.96	67	5.459	202	69.13	20	53.717	109	53.59	36
29.2	39.571	100	24.57	60	61.318	102	25.55	59	5.250	209	68.89	24	53.605	112	53.02	57
y 9.2	39.475	96	25.08	51	61.219	99	26.04	49	5.041	209	68.23	66	53.493	112	52.25	77
19.2	39.385	90	25.50	42	61.126	93	26.41	37	4.837	204	67.17	106	53.385	108	51.31	94
29.2	39.305	80	25.80	30	61.042	84	26.64	23	4.647	190	65.75	142	53.284	101	50.23	108
g. 8.1	39.239	66	25.95	15	60.971	71	26.73	9	4.478	169	63.98	177	53.195	89	49.03	120
18.1	39.188	51	25.96	1	60.916	55	26.65	8	4.337	141	61.94	204	53.125	70	47.79	124
28.1	39.158	30	25.79	17	60.882	34	26.37	28	4.234	103	59.72	222	53.076	49	46.52	127
pt. 7.0	39.153	5	25.44	35	60.871	11	25.90	47	4.176	58	57.37	235	53.055	21	45.31	121
17.0	39.178	25	24.88	56	60.891	20	25.21	69	4.171	5	54.99	238	53.068	13	44.19	112
27.0	39.236	58	24.09	79	60.944	53	24.30	91	4.225	54	52.68	231	53.119	51	43.23	96
t. 7.0	39.331	95	23.06	103	61.034	90	23.14	116	4.342	117	50.54	214	53.212	93	42.51	72
16.9	39.467	136	21.77	129	61.165	131	21.75	139	4.525	183	48.66	188	53.350	138	42.06	45
26.9	39.643	176	20.26	151	61.337	172	20.12	163	4.772	247	47.14	152	53.534	184	41.96	10
v. 5.9	39.859	216	18.52	174	61.550	213	18.28	184	5.081	309	46.05	109	53.763	229	42.22	26
15.9	40.114	255	16.59	193	61.802	252	16.27	201	5.446	365	45.46	59	54.033	270	42.87	65
25.8	40.400	286	14.50	209	62.086	284	14.11	216	5.856	410	45.40	6	54.338	305	43.91	104
c. 5.8	40.713	313	12.32	218	62.398	312	11.89	222	6.300	444	45.90	50	54.670	332	45.30	139
15.8	41.042	329	10.11	221	62.727	329	9.66	223	6.763	463	46.95	105	55.020	350	47.04	174
25.7	41.378	336	7.94	217	63.063	336	7.48	218	7.232	469	48.52	157	55.375	355	49.06	202
35.7	41.711	333	5.87	207	63.396	333	5.44	204	7.689	457	50.56	204	55.725	350	51.30	224
...Place	37.180		37.72		58.908		37.95		2.987		37.19		51.206		29.59	
..., Tan δ	1.008		+0.124		1.013		+0.162		1.564		−1.203		1.080		−0.407	
..., $D_\psi a$	+0.06		+0.01		+0.06		+0.01		+0.06		−0.08		+0.06		−0.03	
$D_\psi \delta$	−0.4		0.0		−0.4		0.0		−0.4		0.0		−0.4		0.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	4 H. Draconis. Mag. 5.1 Right Ascension.		Declination.		δ Crucis. Mag. 3.1 Right Ascension.		Declination.		δ Ursæ Majoris. Mag. 3.4 Right Ascension.		Declination.		γ Corv Mag. 2. Right Ascension.	
	h m 12 8		° ′ +78 3		h m 12 10		° ′ −58 17		h m 12 11		° ′ +57 28		h m 12 11	
	s		″		s		″		s		″		s	
Jan. 0.7	22.32	116	71.91	19 —	45.128	525	5.58	216	21.183	515	72.89	80	33.234	339
10.7	23.48	110	71.72	48	45.653	489	7.74	260	21.698	491	72.09	19 —	33.573	319
20.7	24.58	101	72.20	110	46.142	443	10.34	294	22.189	452	71.90	40	33.892	290
30.6	25.59	89	73.30	167	46.585	384	13.28	321	22.641	398	72.30	99	34.182	255
Feb. 9.6	26.48	74	74.97	217	46.969	321	16.49	339	23.039	332	73.29	149	34.437	214
19.6	27.22	55	77.14	259	47.290	253	19.88	348	23.371	259	74.78	193	34.651	173
Mar. 1.6	27.77	36	79.73	286	47.543	184	23.36	350	23.630	181	76.71	228	34.824	130
11.5	28.13	15 —	82.59	304	47.727	118	26.86	343	23.811	102	78.99	253	34.954	90
21.5	28.28	5	85.63	306	47.845	54 —	30.29	331	23.913	27 —	81.52	265	35.044	52
31.5	28.23	25	88.69	300	47.899	7	33.60	310	23.940	45	84.17	267	35.096	19 —
Apr. 10.5	27.98	41	91.69	280	47.892	60	36.70	286	23.895	107	86.84	257	35.115	11
20.4	27.57	56	94.49	250	47.832	108	39.56	254	23.788	162	89.41	240	35.104	35
30.4	27.01	70	96.99	211	47.724	151	42.10	219	23.626	205	91.81	212	35.069	56
May 10.4	26.31	80	99.10	166	47.573	189	44.29	181	23.421	241	93.93	177	35.013	73
20.3	25.51	87	100.76	116	47.384	220	46.10	137	23.180	266	95.70	139	34.940	85
30.3	24.64	91	101.92	62	47.164	245	47.47	95	22.914	281	97.09	94	34.855	95
June 9.3	23.73	94	102.54	7 —	46.919	263	48.42	45 —	22.633	288	98.03	48	34.760	102
19.3	22.79	92	102.61	50	46.656	275	48.87	2	22.345	287	98.51	0	34.658	105
29.2	21.87	89	102.11	102	46.381	276	48.85	47	22.058	278	98.51	47	34.553	106
July 9.2	20.98	84	101.09	154	46.105	272	48.38	94	21.780	262	98.04	94	34.447	104
19.2	20.14	76	99.55	203	45.833	256	47.44	137	21.518	240	97.10	139	34.343	9
29.2	19.38	68	97.52	247	45.577	232	46.07	176	21.278	211	95.71	181	34.247	8
Aug. 8.1	18.70	58	95.05	284	45.345	197	44.31	209	21.067	176	93.90	220	34.161	7
18.1	18.12	45	92.21	319	45.148	149	42.22	235	20.891	135	91.70	255	34.091	4
28.1	17.67	31	89.02	345	44.999	94	39.87	252	20.756	89	89.15	284	34.042	2 —
Sept. 7.0	17.36	18	85.57	365	44.905	31 —	37.35	262	20.667	36 —	86.31	310	34.019	
17.0	17.18	3 —	81.92	377	44.874	42	34.73	258	20.631	21	83.21	330	34.027	4
27.0	17.15	13	78.15	383	44.916	119	32.15	247	20.652	84	79.91	343	34.071	8
Oct. 7.0	17.28	29	74.32	380	45.035	200	29.68	223	20.736	150	76.48	350	34.157	12
16.9	17.57	45	70.52	370	45.235	278	27.45	190	20.886	217	72.98	350	34.285	17
26.9	18.02	62	66.82	348	45.513	353	25.55	147	21.103	284	69.48	342	34.458	21
Nov. 5.9	18.64	76	63.34	319	45.866	420	24.08	99	21.387	348	66.06	324	34.676	25
15.9	19.40	89	60.15	282	46.286	476	23.09	42 —	21.735	406	62.82	297	34.935	29
25.8	20.29	101	57.33	234	46.762	516	22.67	15	22.141	455	59.85	263	35.229	32
Dec. 5.8	21.30	111	54.99	181	47.278	541	22.82	74	22.596	491	57.22	220	35.550	33
15.8	22.41	114	53.18	121	47.819	548	23.56	131	23.087	512	55.02	169	35.888	34
25.7	23.55	117	51.97	58	48.367	537	24.87	184	23.599	517	53.33	115	36.236	34
35.7	24.72		51.39		48.904		26.71		24.116		52.18		36.579	
Mean Place	19.650		98.71		44.064		15.32		19.618		97.50		32.104	
Sec δ, Tan δ	4.838		+4.734		1.903		−1.619		1.861		+1.569		1.046	
$D_\psi a$, $D_\omega a$	+0.06		+0.32		+0.06		−0.11		+0.06		+0.10		+0.06	
$D_\psi \delta$, $D_\omega \delta$	−0.4		0.0		−0.4		0.0		−0.4		0.0		−0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	20 Comæ. Mag. 5.7				δ Corvi. Mag. 3.1				γ Crucis. Mag. 1.6				8 Canum V Mag. 4	
	Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.	
	h m 12 25		° ′ +21 20		h m 12 25		° ′ −16 3		h m 12 26		° ′ −56 38		h m 12 29	
	s		″		s		″		s		″		s	
Jan. 0.7	34.365		64.53		35.120		15.13		33.971		44.91		49.531	
10.7	34.711	346	62.71	182	35.461	341	17.37	224	34.490	519	46.90	199	49.933	402
20.7	35.043	332	61.26	145	35.786	325	19.65	228	34.979	489	49.34	244	50.321	388
30.7	35.349	306	60.19	107	36.083	297	21.92	227	35.426	447	52.12	278	50.680	359
Feb. 9.6	35.622	273	59.53	66	36.347	264	24.11	219	35.821	395	55.19	307	51.002	322
19.6	35.856	234	59.28	25	36.574	227	26.15	204	36.158	337	58.45	326	51.278	276
Mar. 1.6	36.046	190	59.41	13	36.760	186	28.03	188	36.431	273	61.81	336	51.502	224
11.6	36.192	146	59.89	48	36.905	145	29.69	166	36.642	211	65.21	340	51.671	169
21.5	36.294	102	60.69	80	37.009	104	31.14	145	36.790	148	68.56	335	51.784	113
31.5	36.354	60	61.72	103	37.076	67	32.35	121	36.875	85	71.81	325	51.844	60
Apr. 10.5	36.377	23	62.94	122	37.110	34	33.34	99	36.904	29	74.86	305	51.854	10
20.4	36.366	11	64.26	132	37.114	4	34.10	76	36.878	26	77.70	284	51.819	35
30.4	36.328	38	65.62	136	37.092	22	34.65	55	36.805	73	80.26	256	51.745	74
May 10.4	36.265	63	66.97	135	37.049	43	34.99	34	36.689	116	82.49	223	51.639	106
20.4	36.185	80	68.25	128	36.987	62	35.13	14	36.534	155	84.37	188	51.508	131
30.3	36.090	95	69.40	115	36.910	77	35.08	5	36.348	186	85.84	147	51.356	152
June 9.3	35.984	106	70.41	101	36.821	89	34.85	23	36.132	216	86.88	104	51.189	167
19.3	35.871	113	71.24	83	36.724	97	34.47	38	35.895	237	87.47	59	51.014	175
29.3	35.754	117	71.85	61	36.621	103	33.93	54	35.643	252	87.60	13	50.835	179
July 9.2	35.639	115	72.25	40	36.514	107	33.25	68	35.382	261	87.27	33	50.657	178
19.2	35.525	114	72.40	15	36.408	106	32.47	78	35.125	257	86.49	78	50.484	173
29.2	35.417	108	72.31	9	36.306	102	31.59	88	34.875	250	85.28	121	50.323	161
Aug. 8.1	35.320	97	71.97	34	36.213	93	30.65	94	34.644	231	83.69	159	50.175	148
18.1	35.237	83	71.37	60	36.133	80	29.69	96	34.444	200	81.76	193	50.048	127
28.1	35.175	62	70.52	85	36.073	60	28.74	95	34.283	161	79.55	221	49.944	104
Sept. 7.1	35.135	40	69.41	111	36.038	35	27.85	89	34.172	111	77.15	240	49.871	73
17.0	35.126	9	68.05	136	36.032	6	27.09	76	34.120	52	74.64	251	49.835	36
27.0	35.151	25	66.43	162	36.062	30	26.49	60	34.136	16	72.11	253	49.840	5
Oct. 7.0	35.214	63	64.59	184	36.133	71	26.10	39	34.226	90	69.68	243	49.891	51
17.0	35.319	105	62.52	207	36.248	115	25.99	11	34.393	167	67.47	221	49.992	101
26.9	35.469	150	60.27	225	36.407	159	26.18	19	34.639	246	65.55	192	50.145	153
Nov. 5.9	35.663	194	57.87	240	36.612	205	26.69	51	34.958	319	64.02	153	50.351	206
15.9	35.899	236	55.38	249	36.859	247	27.55	86	35.345	387	62.95	107	50.609	258
25.8	36.174	275	52.84	254	37.143	284	28.74	119	35.789	444	62.42	53	50.914	305
Dec. 5.8	36.482	308	50.33	251	37.457	314	30.23	149	36.279	490	62.45	3	51.258	344
15.8	36.813	331	47.92	241	37.791	334	32.01	178	36.797	518	63.04	59	51.633	375
25.8	37.158	345	45.69	223	38.136	345	34.00	199	37.328	531	64.19	115	52.029	396
35.7	37.506	348	43.72	197	38.481	345	36.16	216	37.856	528	65.87	168	52.430	401
Mean Place	33.217		80.18		34.065		12.48		33.028		54.24		48.338	
Sec δ, Tan δ	1.074		+0.391		1.041		−0.288		1.819		−1.520		1.341	
$D_\psi a$, $D_\omega a$	+0.06		+0.03		+0.06		−0.02		+0.07		−0.10		+0.06	
$D_\psi \delta$, $D_\omega \delta$	−0.4		−0.1		−0.4		−0.1		−0.4		−0.1		−0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

	κ Draconis. Mag. 3.9				β Corvi. Mag. 2.8				24 Comæ seq. Mag. 5.2				α Muscæ. Mag. 2.9			
	Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	12 29		+70 13		12 30		−22 56		12 30		+18 49		12 32		−68 40	
	s		″		s		″		s		″		s		″	
7	58.43	75	77.66	69	2.421	353	16.71	222	59.134	343	46.63	189	13.88	73	30.62	171
7	59.18	73	76.97	3	2.774	337	18.93	235	59.477	330	44.74	154	14.61	70	32.33	223
7	59.91	68	76.94	61	3.111	309	21.28	240	59.807	305	43.20	118	15.31	64	34.56	267
7	60.59	61	77.55	122	3.420	276	23.68	239	60.112	273	42.02	80	15.95	56	37.23	304
6	61.20	52	78.77	177	3.696	237	26.07	231	60.385	236	41.22	39	16.51	49	40.27	332
6	61.72	42	80.54	224	3.933	196	28.38	219	60.621	193	40.83	2	17.00	39	43.59	352
6	62.14	29	82.78	260	4.129	153	30.57	201	60.814	150	40.81	34	17.39	30	47.11	362
.6	62.43	18	85.38	285	4.282	113	32.58	184	60.964	107	41.15	65	17.69	21	50.73	364
.5	62.61	6	88.23	298	4.395	74	34.42	161	61.071	66	41.80	89	17.90	12	54.37	360
.5	62.67	7	91.21	299	4.469	41	36.03	139	61.137	30	42.69	108	18.02	4	57.97	347
.5	62.60	18	94.20	288	4.510	8	37.42	115	61.167	3	43.77	122	18.06	6	61.44	328
.4	62.42	26	97.08	266	4.518	19	38.57	93	61.164	32	44.99	127	18.00	13	64.72	302
.4	62.16	35	99.74	236	4.499	42	39.50	68	61.132	54	46.26	128	17.87	20	67.74	270
.4	61.81	42	102.10	197	4.457	62	40.18	45	61.078	74	47.54	123	17.67	26	70.44	234
.4	61.39	47	104.07	152	4.395	79	40.63	21	61.004	89	48.77	112	17.41	32	72.78	192
.3	60.92	51	105.59	103	4.316	92	40.84	1	60.915	100	49.89	101	17.09	37	74.70	146
.3	60.41	52	106.62	51	4.224	103	40.83	24	60.815	108	50.90	85	16.72	40	76.16	97
.3	59.89	53	107.13	3	4.121	111	40.59	44	60.707	112	51.75	65	16.32	43	77.13	45
.3	59.36	53	107.10	55	4.010	114	40.15	65	60.595	114	52.40	46	15.89	45	77.58	6
.2	58.83	50	106.55	107	3.896	115	39.50	82	60.481	112	52.86	23	15.44	44	77.52	57
).2	58.33	48	105.48	156	3.781	112	38.68	97	60.369	107	53.09	2	15.00	43	76.95	107
).2	57.85	43	103.92	203	3.669	104	37.71	110	60.262	98	53.11	23	14.57	40	75.88	154
3.1	57.42	37	101.89	245	3.565	89	36.61	120	60.164	86	52.88	46	14.17	36	74.34	196
3.1	57.05	31	99.44	282	3.476	69	35.41	122	60.078	65	52.42	72	13.81	29	72.38	231
3.1	56.74	24	96.62	315	3.407	44	34.19	120	60.013	43	51.70	96	13.52	22	70.07	259
7.1	56.50	15	93.47	342	3.363	12	32.99	113	59.970	14	50.74	121	13.30	12	67.48	276
7.0	56.35	6	90.05	360	3.351	26	31.86	99	59.956	20	49.53	146	13.18	1	64.72	285
7.0	56.29	3	86.45	373	3.377	69	30.87	79	59.976	58	48.07	170	13.17	9	61.87	281
7.0	56.32	13	82.72	378	3.446	114	30.08	54	60.034	99	46.37	192	13.26	21	59.06	266
7.0	56.45	24	78.94	375	3.560	162	29.54	23	60.133	143	44.45	214	13.47	33	56.40	241
6.9	56.69	35	75.19	363	3.722	209	29.31	12	60.276	187	42.31	230	13.80	43	53.99	203
5.9	57.04	44	71.56	340	3.931	253	29.43	48	60.463	231	40.01	241	14.23	54	51.96	158
5.9	57.48	54	68.16	310	4.184	293	29.91	86	60.694	270	37.60	247	14.77	62	50.38	105
5.8	58.02	62	65.06	271	4.477	324	30.77	123	60.964	302	35.13	248	15.39	69	49.33	45
5.8	58.64	68	62.35	223	4.801	346	32.00	157	61.266	326	32.65	240	16.08	73	48.88	14
5.8	59.32	72	60.12	168	5.147	357	33.57	186	61.592	340	30.25	226	16.81	75	49.02	75
5.8	60.04	75	58.44	106	5.504	356	35.43	210	61.932	345	27.99	202	17.56	74	49.77	136
5.7	60.79		57.38		5.860		37.53		62.277		25.97		18.30		51.13	
ace	56.924		104.25		1.405		16.40		58.031		61.51		13.073		42.18	
an δ	2.958		+2.784		1.086		−0.423		1.057		+0.341		2.751		−2.562	
a	+0.05		+0.18		+0.06		−0.03		+0.06		+0.02		+0.07		−0.17	
δ	−0.4		−0.1		−0.4		−0.1		−0.4		−0.1		−0.4		−0.1	

8°—1917——27

FOR THE UPPER TRANSIT AT

FOR THE UPPER TRANSIT AT WASHINGTON.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ε Ursæ Majoris. (*Alioth.*) Mag. 1.7				δ Virginis. Mag. 3.7				α Can. Ven. *seq.* Mag. 2.9				δ Musc… Mag. 3.6	
	Right Ascension.	Diff.	Declination.	Diff.	Right Ascension.	Diff.	Declination.	Diff.	Right Ascension.	Diff.	Declination.	Diff.	Right Ascension.	Diff.
	h m 12 50		° ′ +56 23		h m 12 51		° ′ + 3 50		h m 12 52		° ′ +38 45		h m 12 56	
	s		″		s		″		s		″		s	
Jan. 0.8	23.948	501	71.62	128	26.250	334	43.90	209	9.829	390	38.03	166	32.73	84
10.7	24.449	492	70.34	68	26.584	324	41.81	193	10.219	381	36.37	116	33.57	80
20.7	24.941	467	69.66	4	26.908	302	39.88	170	10.600	359	35.21	64	34.37	75
30.7	25.408	425	69.62	55	27.210	275	38.18	145	10.959	328	34.57	10	35.12	69
Feb. 9.6	25.833	370	70.17	113	27.485	241	36.73	114	11.287	287	34.47	42	35.81	61
19.6	26.203	309	71.30	165	27.726	203	35.59	84	11.574	241	34.89	91	36.42	50
Mar. 1.6	26.512	238	72.95	208	27.929	165	34.75	54	11.815	190	35.80	133	36.92	41
11.6	26.750	166	75.03	239	28.094	126	34.21	24	12.005	138	37.13	168	37.33	31
21.5	26.916	93	77.42	263	28.220	89	33.97	2	12.143	89	38.81	193	37.64	22
31.5	27.009	24	80.05	274	28.309	55	33.99	25	12.232	41	40.74	212	37.86	10
Apr. 10.5	27.033	42	82.79	274	28.364	24	34.24	42	12.273	2	42.86	218	37.96	2
20.5	26.991	101	85.53	263	28.388	2	34.66	57	12.271	41	45.04	217	37.98	7
30.4	26.890	151	88.16	244	28.386	27	35.23	68	12.230	75	47.21	207	37.91	16
May 10.4	26.739	192	90.60	215	28.359	46	35.91	74	12.155	102	49.28	191	37.75	24
20.4	26.547	228	92.75	180	28.313	62	36.65	76	12.053	126	51.19	166	37.51	31
30.3	26.319	255	94.55	141	28.251	78	37.41	77	11.927	141	52.85	139	37.20	38
June 9.3	26.064	271	95.96	95	28.173	89	38.18	74	11.786	159	54.24	106	36.82	43
19.3	25.793	282	96.91	49	28.084	97	38.92	69	11.627	166	55.30	71	36.39	47
29.3	25.511	285	97.40	1	27.987	103	39.61	63	11.461	169	56.01	33	35.92	50
July 9.2	25.226	281	97.41	47	27.884	105	40.24	55	11.292	169	56.34	5	35.42	51
19.2	24.945	270	96.94	95	27.779	105	40.79	45	11.123	163	56.29	42	34.91	51
29.2	24.675	251	95.99	140	27.674	100	41.24	33	10.960	154	55.87	81	34.40	49
Aug. 8.2	24.424	226	94.59	183	27.574	91	41.57	18	10.806	140	55.06	119	33.91	44
18.1	24.198	194	92.76	223	27.483	75	41.75	4	10.666	118	53.87	153	33.47	37
28.1	24.004	154	90.53	260	27.408	56	41.79	15	10.548	93	52.34	186	33.10	30
Sept. 7.1	23.850	107	87.93	290	27.352	29	41.64	34	10.455	60	50.48	218	32.80	21
17.0	23.743	54	85.03	317	27.323	1	41.30	56	10.395	22	48.30	246	32.59	9
27.0	23.689	6	81.86	337	27.324	39	40.74	81	10.373	23	45.84	270	32.50	3
Oct. 7.0	23.695	70	78.49	352	27.363	81	39.93	104	10.396	70	43.14	289	32.53	17
17.0	23.765	139	74.97	358	27.444	124	38.89	130	10.466	121	40.25	304	32.70	29
26.9	23.904	208	71.39	358	27.568	168	37.59	155	10.587	175	37.21	312	32.99	42
Nov. 5.9	24.112	278	67.81	346	27.736	212	36.04	176	10.762	227	34.09	313	33.41	54
15.9	24.390	342	64.35	328	27.948	252	34.28	195	10.989	275	30.96	305	33.95	66
25.9	24.732	399	61.07	299	28.200	285	32.33	210	11.264	318	27.91	290	34.61	73
Dec. 5.8	25.131	445	58.08	261	28.485	311	30.23	218	11.582	353	25.01	265	35.34	79
15.8	25.576	477	55.47	215	28.796	327	28.05	220	11.935	375	22.36	234	36.13	83
25.8	26.053	497	53.32	162	29.123	333	25.85	214	12.310	385	20.02	192	36.96	83
35.7	26.550		51.70		29.456		23.71		12.695		18.10		37.79	
Mean Place	22.936		96.46		25.308		53.79		8.856		58.99		32.256	
Sec δ, Tan δ	1.807		+1.505		1.002		+0.067		1.282		+0.803		3.088	
$D_\psi\,\alpha,\ D_\omega\,\alpha$	+0.05		+0.10		+0.06		0.00		+0.06		+0.05		+0.08	
$D_\psi\,\delta,\ D_\omega\,\delta$	−0.4		−0.2		−0.4		−0.2		−0.4		−0.2		−0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

shington n Time.	ε Virginis. Mag. 3.0 Right Ascension.		Declination.		θ Virginis. Mag. 4.4 Right Ascension.		Declination.	
	h m 12 58		° ′ +11 23		h m 13 5		° ′ − 5 5	
	s		″		s		″	
ı. 0.8	3.623	338	65.41	205	39.882	338	53.04	209
10.7	3.961	328	63.36	181	40.220	329	55.13	204
20.7	4.289	308	61.55	151	40.549	309	57.17	192
30.7	4.597	283	60.04	117	40.858	285	59.09	173
›. 9.7	4.880	249	58.87	82	41.143	252	60.82	152
19.6	5.129	211	58.05	46	41.395	217	62.34	127
r. 1.6	5.340	172	57.59	11	41.612	179	63.61	102
11.6	5.512	132	57.48	20	41.791	143	64.63	75
21.6	5.644	96	57.68	47	41.934	107	65.38	51
31.5	5.740	59	58.15	72	42.041	73	65.89	28
r. 10.5	5.799	27	58.87	87	42.114	43	66.17	8
20.5	5.826	0	59.74	98	42.157	15	66.25	9
30.4	5.826	26	60.72	105	42.172	9	66.16	25
y 10.4	5.800	47	61.77	107	42.163	32	65.91	35
20.4	5.753	66	62.84	104	42.131	49	65.56	45
30.4	5.687	80	63.88	98	42.082	67	65.11	52
ne 9.3	5.607	92	64.86	89	42.015	80	64.59	58
19.3	5.515	101	65.75	77	41.935	91	64.01	61
29.3	5.414	108	66.52	63	41.844	100	63.40	63
ly 9.3	5.306	112	67.15	47	41.744	106	62.77	62
19.2	5.194	111	67.62	29	41.638	108	62.15	61
29.2	5.083	106	67.91	12	41.530	105	61.54	58
g. 8.2	4.977	98	68.03	8	41.425	98	60.96	51
18.1	4.879	84	67.95	30	41.327	86	60.45	42
28.1	4.795	63	67.65	51	41.241	65	60.03	30
pt. 7.1	4.732	38	67.14	76	41.176	41	59.73	15
17.1	4.694	7	66.38	99	41.135	9	59.58	2
27.0	4.687	30	65.39	125	41.126	28	59.60	25
t. 7.0	4.717	71	64.14	148	41.154	69	59.85	48
17.0	4.788	116	62.66	172	41.223	115	60.33	75
26.9	4.904	161	60.94	193	41.338	161	61.08	101
v. 5.9	5.065	205	59.01	213	41.499	205	62.09	129
15.9	5.270	246	56.88	225	41.704	247	63.38	154
25.9	5.516	281	54.63	233	41.951	281	64.92	174
c. 5.8	5.797	310	52.30	234	42.232	310	66.66	192
15.8	6.107	326	49.96	228	42.542	327	68.58	203
25.8	6.433	335	47.68	215	42.869	335	70.61	209
35.8	6.768		45.53		43.204		72.70	
n Place	2.714		77.96		39.035		46.26	
δ, Tan δ	1.020		+0.202		1.004		−0.089	
, $D_\psi \alpha$	+0.06		+0.01		+0.06		−0.01	
$D_\psi \delta$	−0.4		−0.3		−0.4		−0.3	

shington n Time.	43 Comæ. Mag. 4.3 Right Ascension.		Declination.		20 Canum Venat. Mag. 4.7 Right Ascension.		Declination.	
	h m 13 8		° ′ +28 17		h m 13 13		° ′ +40 59	
	s		″		s		″	
ı. 0.8	0.960	358	37.03	191	50.216	395	72.15	182
10.7	1.318	350	35.12	150	50.611	391	70.33	130
20.7	1.668	335	33.62	105	51.002	376	69.03	75
30.7	2.003	307	32.57	58	51.378	348	68.28	19
›. 9.7	2.310	273	31.99	9	51.726	310	68.09	35
19.6	2.583	235	31.90	37	52.036	268	68.44	87
r. 1.6	2.818	191	32.27	78	52.304	218	69.31	134
11.6	3.009	147	33.05	115	52.522	168	70.65	172
21.6	3.156	103	34.20	144	52.690	117	72.37	202
31.5	3.259	63	35.64	167	52.807	66	74.39	222
r. 10.5	3.322	25	37.31	180	52.873	21	76.61	233
20.5	3.347	8	39.11	185	52.894	21	78.94	234
30.4	3.339	39	40.96	183	52.873	59	81.28	227
y 10.4	3.300	65	42.79	175	52.814	91	83.55	210
20.4	3.235	87	44.54	160	52.723	119	85.65	189
30.4	3.148	104	46.14	141	52.604	141	87.54	160
ne 9.3	3.044	120	47.55	116	52.463	160	89.14	126
19.3	2.924	131	48.71	90	52.303	172	90.40	90
29.3	2.793	138	49.61	61	52.131	180	91.30	51
ly 9.3	2.655	141	50.22	30	51.951	185	91.81	11
19.2	2.514	142	50.52	1	51.766	185	91.92	29
29.2	2.372	137	50.51	34	51.581	177	91.63	71
g. 8.2	2.235	127	50.17	66	51.404	165	90.92	110
18.1	2.108	111	49.51	97	51.239	148	89.82	148
28.1	1.997	92	48.54	130	51.091	123	88.34	184
pt. 7.1	1.905	63	47.24	159	50.968	92	86.50	218
17.1	1.842	29	45.65	187	50.876	55	84.32	248
27.0	1.813	9	43.78	214	50.821	10	81.84	274
t. 7.0	1.822	52	41.64	237	50.811	39	79.10	297
17.0	1.874	100	39.27	257	50.850	94	76.13	313
26.9	1.974	150	36.70	271	50.944	147	73.00	323
v. 5.9	2.124	198	33.99	281	51.091	203	69.77	326
15.9	2.322	244	31.18	283	51.294	256	66.51	319
25.9	2.566	283	28.35	277	51.550	303	63.32	304
c. 5.8	2.849	318	25.58	263	51.853	343	60.28	282
15.8	3.167	340	22.95	242	52.196	370	57.46	248
25.8	3.507	353	20.53	211	52.566	390	54.98	208
35.8	3.860		18.42		52.956		52.90	
n Place	0.119		55.05		49.448		93.61	
δ, Tan δ	1.136		+0.538		1.325		+0.869	
, $D_\psi \alpha$	+0.06		+0.03		+0.05		+0.06	
$D_\psi \delta$	−0.4		−0.3		−0.4		−0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ε Centauri. Mag. 2.6 Right Ascension.		ε Centauri. Declination.		*m* Virginis. Mag. 5.2 Right Ascension.		*m* Virginis. Declination.		τ Boötis. Mag. 4.5 Right Ascension.		τ Boötis. Declination.		η Ursæ M (Alkai Mag. Right Ascension.	
	h m		° ′		h m		° ′		h m		° ′		h m	
	13 34		−53 2		13 37		− 8 17		13 43		+17 51		13 44	
	s		″		s		″		s		″		s	
Jan. 0.8	37.607	506	34.11	121	15.868	339	10.32	199	19.678	337	57.21	213	16.726	429
10.8	38.113	497	35.32	164	16.207	335	12.31	197	20.015	336	55.08	186	17.155	436
20.7	38.610	479	36.96	202	16.542	323	14.28	190	20.351	327	53.22	150	17.591	428
30.7	39.089	447	38.98	233	16.865	302	16.18	176	20.678	307	51.72	110	18.019	406
Feb. 9.7	39.536	407	41.31	258	17.167	275	17.94	157	20.985	281	50.62	68	18.425	373
19.7	39.943	360	43.89	275	17.442	242	19.51	136	21.266	249	49.94	25	18.798	329
Mar. 1.6	40.303	310	46.64	287	17.684	209	20.87	112	21.515	214	49.69	15	19.127	277
11.6	40.613	259	49.51	291	17.893	174	21.99	89	21.729	176	49.84	52	19.404	223
21.6	40.872	206	52.42	290	18.067	140	22.88	64	21.905	140	50.36	85	19.627	166
31.5	41.078	154	55.32	283	18.207	106	23.52	43	22.045	103	51.21	112	19.793	108
Apr. 10.5	41.232	104	58.15	271	18.313	75	23.95	22	22.148	69	52.33	131	19.901	52
20.5	41.336	55	60.86	254	18.388	48	24.17	5	22.217	36	53.64	144	19.953	2
30.5	41.391	8	63.40	232	18.436	19	24.22	11	22.253	8	55.08	150	19.951	48
May 10.4	41.399	36	65.72	206	18.455	4	24.11	25	22.261	19	56.58	151	19.903	93
20.4	41.363	79	67.78	177	18.451	27	23.86	34	22.242	42	58.09	146	19.810	133
30.4	41.284	117	69.55	145	18.424	47	23.52	43	22.200	66	59.55	136	19.677	166
June 9.4	41.167	153	71.00	108	18.377	67	23.09	49	22.134	83	60.91	120	19.511	193
19.3	41.014	182	72.08	69	18.310	82	22.60	55	22.051	100	62.11	104	19.318	216
29.3	40.832	209	72.77	28	18.228	96	22.05	59	21.951	115	63.15	84	19.102	232
July 9.3	40.623	227	73.05	12	18.132	108	21.46	60	21.836	124	63.99	61	18.870	243
19.2	40.396	237	72.93	53	18.024	115	20.86	62	21.712	131	64.60	37	18.627	247
29.2	40.159	238	72.40	93	17.909	117	20.24	60	21.581	134	64.97	11	18.380	245
Aug. 8.2	39.921	230	71.47	130	17.792	114	19.64	57	21.447	130	65.08	15	18.135	237
18.2	39.691	209	70.17	162	17.678	106	19.07	52	21.317	121	64.93	41	17.898	219
28.1	39.482	177	68.55	189	17.572	91	18.55	43	21.196	107	64.52	70	17.679	196
Sept. 7.1	39.305	135	66.66	211	17.481	67	18.12	31	21.089	86	63.82	96	17.483	163
17.1	39.170	82	64.55	223	17.414	39	17.81	15	21.003	56	62.86	125	17.320	122
27.1	39.088	18	62.32	226	17.375	4	17.66	3	20.947	21	61.61	153	17.198	75
Oct. 7.0	39.070	53	60.06	220	17.371	39	17.69	25	20.926	19	60.08	177	17.123	19
17.0	39.123	128	57.86	204	17.410	84	17.94	48	20.945	64	58.31	202	17.104	42
27.0	39.251	203	55.82	179	17.494	132	18.42	75	21.009	113	56.29	223	17.146	104
Nov. 5.9	39.454	278	54.03	146	17.626	180	19.17	101	21.122	161	54.06	240	17.250	170
15.9	39.732	345	52.57	105	17.806	224	20.18	128	21.283	207	51.66	252	17.420	235
25.9	40.077	404	51.52	59	18.030	264	21.46	150	21.490	249	49.14	258	17.655	294
Dec. 5.9	40.481	450	50.93	10	18.294	296	22.96	171	21.739	284	46.56	255	17.949	345
15.8	40.931	483	50.83	40	18.590	320	24.67	186	22.023	313	44.01	246	18.294	387
25.8	41.414	499	51.23	89	18.910	333	26.53	195	22.336	328	41.55	229	18.681	415
35.8	41.913		52.12		19.243		28.48		22.664		39.26		19.096	
Mean Place	37.129		41.91		15.201		4.56		19.071		71.79		16.341	
Sec δ, Tan δ	1.664		−1.329		1.011		−0.146		1.051		+0.322		1.547	
$D_\psi a$, $D_\omega a$	+0.08		−0.08		+0.06		−0.01		+0.06		+0.02		+0.05	
$D_\psi \delta$, $D_\omega \delta$	−0.4		−0.4		−0.4		−0.4		−0.4		−0.4		−0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

FOR THE UPPER TRANSIT AT WASHINGTON.

FOR THE UPPER TRANSIT AT

FOR THE UPPER TRANSIT AT WASHINGTON.

ngton Time.	λ Virginis. Mag. 4.6 Right Ascension.		λ Virginis. Declination.		2 Libræ. Mag. 6.3 Right Ascension.		2 Libræ. Declination.		θ Boötis. Mag. 4.1 Right Ascension.		θ Boötis. Declination.		f Boötis. Mag. 5.4 Right Ascension.		f Boötis. Declination.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	14 14		−12 59		14 18		−11 20		14 22		+52 13		14 22		+19 35	
	s		″		s		″		s		″		s		″	
0.8	37.380	337	26.98	176	57.924	334	12.71	178	22.235	421	39.80	231	36.046	327	43.59	228
10.8	37.717	341	28.74	180	58.258	339	14.49	180	22.656	441	37.49	177	36.373	335	41.31	198
20.8	38.058	335	30.54	179	58.597	334	16.29	177	23.097	445	35.72	118	36.708	332	39.33	162
30.7	38.393	320	32.33	170	58.931	320	18.06	167	23.542	434	34.54	53	37.040	321	37.71	121
9.7	38.713	299	34.03	158	59.251	298	19.73	154	23.976	410	34.01	10	37.361	301	36.50	77
19.7	39.012	273	35.61	142	59.549	274	21.27	136	24.386	376	34.11	73	37.662	276	35.73	31
1.7	39.285	242	37.03	123	59.823	244	22.63	114	24.762	330	34.84	130	37.938	245	35.42	13
11.6	39.527	210	38.26	103	60.067	213	23.77	94	25.092	278	36.14	181	38.183	212	35.55	54
21.6	39.737	180	39.29	82	60.280	182	24.71	72	25.370	224	37.95	224	38.395	178	36.09	90
31.6	39.917	147	40.11	61	60.462	150	25.43	51	25.594	166	40.19	256	38.573	144	36.99	122
10.5	40.064	116	40.72	44	60.612	120	25.94	33	25.760	107	42.75	277	38.717	108	38.21	145
20.5	40.180	88	41.16	25	60.732	91	26.27	14	25.867	49	45.52	287	38.825	76	39.66	162
30.5	40.268	58	41.41	11	60.823	61	26.41	1	25.916	6	48.39	287	38.901	45	41.28	171
10.5	40.326	30	41.52	3	60.884	34	26.42	12	25.910	57	51.26	278	38.946	14	42.99	175
20.4	40.356	6	41.49	14	60.918	9	26.30	24	25.853	104	54.04	258	38.960	14	44.74	171
30.4	40.362	21	41.35	25	60.927	18	26.06	32	25.749	147	56.62	232	38.946	41	46.45	160
9.4	40.341	44	41.10	32	60.909	41	25.74	39	25.602	184	58.94	198	38.905	65	48.05	148
19.4	40.297	68	40.78	40	60.868	65	25.35	45	25.418	218	60.92	159	38.840	87	49.53	129
29.3	40.229	87	40.38	47	60.803	85	24.90	49	25.200	244	62.51	116	38.753	107	50.82	107
9.3	40.142	106	39.91	52	60.718	103	24.41	53	24.956	265	63.67	70	38.646	125	51.89	84
19.3	40.036	119	39.39	55	60.615	118	23.88	57	24.691	279	64.37	23	38.521	137	52.73	56
29.2	39.917	126	38.84	59	60.497	126	23.31	57	24.412	285	64.60	26	38.384	145	53.29	29
g. 8.2	39.791	130	38.25	61	60.371	130	22.74	57	24.127	284	64.34	74	38.239	149	53.58	1
18.2	39.661	127	37.64	59	60.241	129	22.17	54	23.843	275	63.60	121	38.090	147	53.59	29
28.2	39.534	116	37.05	56	60.112	117	21.63	49	23.568	256	62.39	166	37.943	136	53.30	59
t. 7.1	39.418	99	36.49	49	59.995	101	21.14	42	23.312	229	60.73	209	37.807	119	52.71	89
17.1	39.319	71	36.00	39	59.894	75	20.72	30	23.083	191	58.64	249	37.688	95	51.82	119
27.1	39.248	37	35.61	24	59.819	41	20.42	15	22.892	145	56.15	283	37.593	62	50.63	148
7.1	39.211	3	35.37	8	59.778	3	20.27	1	22.747	90	53.32	314	37.531	23	49.15	177
17.0	39.214	49	35.29	14	59.775	44	20.28	24	22.657	29	50.18	337	37.508	21	47.38	202
27.0	39.263	97	35.43	36	59.819	94	20.52	46	22.628	39	46.81	355	37.529	70	45.36	225
v. 6.0	39.360	149	35.79	63	59.913	142	20.98	71	22.667	109	43.26	363	37.599	120	43.11	241
15.9	39.509	197	36.42	87	60.055	191	21.69	96	22.776	179	39.63	363	37.719	169	40.67	259
25.9	39.706	241	37.29	113	60.246	235	22.65	121	22.955	246	36.00	352	37.888	216	38.08	265
c. 5.9	39.947	278	38.42	135	60.481	274	23.86	141	23.201	308	32.48	333	38.104	257	35.43	266
15.9	40.225	309	39.77	155	60.755	304	25.27	159	23.509	360	29.15	300	38.361	290	32.77	256
25.8	40.534	327	41.32	169	61.059	324	26.86	171	23.869	401	26.15	260	38.651	315	30.21	241
35.8	40.861		43.01		61.383		28.57		24.270		23.55		38.966		27.80	
n Place	36.912		22.71		57.478		7.90		22.329		62.20		35.703		58.11	
δ, Tan δ	*1.026*		*−0.231*		*1.020*		−0.201		1.633		+1.290		1.061		+0.358	
$D_\psi \alpha$	*+0.06*		*−0.01*		*+0.07*		−0.01		+0.04		+0.07		+0.06		+0.02	
$D_\psi \delta$	*−0.3*		*−0.6*		*−0.3*		−0.6		−0.3		−0.6		−0.3		−0.6	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	φ Virginis. Mag. 5.0 Right Ascension.		φ Virginis. Declination.		δ Ursæ Minoris. Mag. 4.4 Right Ascension.		δ Ursæ Minoris. Declination.		ρ Boötis. Mag. 3.8 Right Ascension.		ρ Boötis. Declination.		γ Boötis. Mag. 3 Right Ascension.	
	h m 14 23		° ′ −1 51		h m 14 27		° ′ +76 3		h m 14 28		° ′ +30 43		h m 14 28	
	s		″		s		″		s		″		s	
Jan. 0.8	55.873	324	30.98	196	38.93	87	29.25	205	15.423	340	49.25	237	44.314	358
10.8	56.197	329	32.94	189	39.80	94	27.20	142	15.763	351	46.88	199	44.672	371
20.8	56.526	326	34.83	175	40.74	97	25.78	77	16.114	350	44.89	153	45.043	374
30.7	56.852	313	36.58	154	41.71	96	25.01	10	16.464	341	43.36	102	45.417	364
Feb. 9.7	57.165	294	38.12	131	42.67	91	24.91	59	16.805	322	42.34	50	45.781	343
19.7	57.459	269	39.43	104	43.58	85	25.50	123	17.127	295	41.84	4	46.124	316
Mar. 1.7	57.728	242	40.47	75	44.43	75	26.73	181	17.422	263	41.88	55	46.440	283
11.6	57.970	211	41.22	48	45.18	62	28.54	230	17.685	227	42.43	102	46.723	242
21.6	58.181	181	41.70	20	45.80	47	30.84	271	17.912	191	43.45	141	46.965	200
31.6	58.362	149	41.90	3	46.27	33	33.55	299	18.103	151	44.86	175	47.165	156
Apr. 10.6	58.511	118	41.87	26	46.60	17	36.54	316	18.254	112	46.61	199	47.321	113
20.5	58.629	90	41.61	43	46.77	1	39.70	320	18.366	75	48.60	217	47.434	71
30.5	58.719	61	41.18	56	46.76	15	42.90	314	18.441	39	50.77	223	47.505	29
May 10.5	58.780	32	40.62	67	46.61	29	46.04	296	18.480	6	53.00	222	47.534	9
20.4	58.812	8	39.95	74	46.32	44	49.00	270	18.486	28	55.22	213	47.525	45
30.4	58.820	18	39.21	76	45.88	55	51.70	236	18.458	58	57.35	199	47.480	79
June 9.4	58.802	40	38.45	78	45.33	65	54.06	194	18.400	85	59.34	178	47.401	110
19.4	58.762	65	37.67	75	44.68	73	56.00	147	18.315	110	61.12	152	47.291	136
29.3	58.697	83	36.92	71	43.95	80	57.47	97	18.205	132	62.64	122	47.155	161
July 9.3	58.614	102	36.21	67	43.15	85	58.44	44	18.073	150	63.86	90	46.994	179
19.3	58.512	117	35.54	59	42.30	87	58.88	9	17.923	165	64.76	54	46.815	194
29.3	58.395	126	34.95	52	41.43	88	58.79	63	17.758	173	65.30	18	46.621	202
Aug. 8.2	58.269	131	34.43	43	40.55	87	58.16	115	17.585	176	65.48	19	46.419	205
18.2	58.138	130	34.00	30	39.68	83	57.01	166	17.409	174	65.29	56	46.214	201
28.2	58.008	120	33.70	16	38.85	77	55.35	212	17.235	163	64.73	93	46.013	189
Sept. 7.1	57.888	104	33.54	3	38.08	71	53.23	255	17.072	145	63.80	130	45.824	168
17.1	57.784	79	33.51	16	37.37	61	50.68	294	16.927	118	62.50	165	45.656	141
27.1	57.705	49	33.67	35	36.76	50	47.74	325	16.809	85	60.85	198	45.515	103
Oct. 7.1	57.656	10	34.02	56	36.26	36	44.49	352	16.724	44	58.87	227	45.412	59
17.0	57.646	34	34.58	80	35.90	23	40.97	371	16.680	4	56.60	255	45.353	9
27.0	57.680	83	35.38	103	35.67	7	37.26	381	16.684	55	54.05	277	45.344	47
Nov. 6.0	57.763	130	36.41	128	35.60	9	33.45	383	16.739	108	51.28	294	45.391	104
16.0	57.893	178	37.69	148	35.69	25	29.62	374	16.847	162	48.34	304	45.495	162
25.9	58.071	223	39.17	168	35.94	41	25.88	355	17.009	213	45.30	304	45.657	218
Dec. 5.9	58.294	261	40.85	183	36.35	58	22.33	326	17.222	259	42.26	299	45.875	267
15.9	58.555	291	42.68	192	36.93	69	19.07	286	17.481	296	39.27	282	46.142	308
25.8	58.846	314	44.60	195	37.62	81	16.21	238	17.777	324	36.45	256	46.450	342
35.8	59.160		46.55		38.43		13.83		18.101		33.89		46.792	
Mean Place	55.458		23.14		40.979		54.14		15.208		66.73		44.200	
Sec δ, Tan δ	1.001		−0.032		4.151		+4.029		1.163		+0.594		1.281	
$D_\psi a$, $D_\omega a$	+0.06		0.00		0.00		+0.22		+0.05		+0.03		+0.05	
$D_\psi \delta$, $D_\omega \delta$	−0.3		−0.6		−0.3		−0.6		−0.3		−0.6		−0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	α Apodis. Mag. 3.8 Right Ascension.		α Apodis. Declination.		μ Virginis. Mag. 4.0 Right Ascension.		μ Virginis. Declination.		ε Boötis. Mag. 2.7 Right Ascension.		ε Boötis. Declination.		109 Virgi Mag. 3 Right Ascension.	
	h m		° ′		h m		° ′		h m		° ′		h m	
	14 37		−78 41		14 38		− 5 17		14 41		+27 24		14 42	
	s		″		s		″		s		″		s	
Jan. 0.8	27.24	131	27.21	40	41.395	322	59.48	185	21.891	327	68.35	242	3.397	316
10.8	28.55	136	26.81	17	41.717	330	61.33	182	22.218	340	65.93	206	3.713	325
20.8	29.91	137	26.98	73	42.047	328	63.15	172	22.558	343	63.87	164	4.038	324
30.8	31.28	134	27.71	125	42.375	319	64.87	156	22.901	335	62.23	117	4.362	316
Feb. 9.7	32.62	128	28.96	173	42.694	301	66.43	136	23.236	320	61.06	66	4.678	298
19.7	33.90	121	30.69	217	42.995	280	67.79	112	23.556	296	60.40	14	4.976	278
Mar. 1.7	35.11	109	32.86	253	43.275	253	68.91	88	23.852	267	60.26	36	5.254	252
11.6	36.20	98	35.39	283	43.528	225	69.79	60	24.119	235	60.62	82	5.506	223
21.6	37.18	84	38.22	307	43.753	195	70.39	37	24.354	199	61.44	124	5.729	195
31.6	38.02	69	41.29	323	43.948	165	70.76	12	24.553	163	62.68	158	5.924	163
Apr. 10.6	38.71	54	44.52	333	44.113	136	70.88	8	24.716	126	64.26	184	6.087	135
20.5	39.25	38	47.85	336	44.249	106	70.80	25	24.842	92	66.10	203	6.222	105
30.5	39.63	20	51.21	331	44.355	78	70.55	39	24.934	56	68.13	213	6.327	76
May 10.5	39.83	5	54.52	320	44.433	51	70.16	49	24.990	22	70.26	215	6.403	48
20.4	39.88	12	57.72	300	44.484	22	69.67	58	25.012	10	72.41	209	6.451	20
30.4	39.76	30	60.72	276	44.506	3	69.09	62	25.002	39	74.50	197	6.471	6
June 9.4	39.46	43	63.48	243	44.503	31	68.47	65	24.963	68	76.47	180	6.465	33
19.4	39.03	57	65.91	205	44.472	54	67.82	65	24.895	94	78.27	156	6.432	56
29.3	38.46	70	67.96	161	44.418	78	67.17	64	24.801	119	79.83	128	6.376	81
July 9.3	37.76	81	69.57	113	44.340	97	66.53	62	24.682	138	81.11	100	6.295	99
19.3	36.95	87	70.70	62	44.243	115	65.91	58	24.544	154	82.11	67	6.196	118
29.3	36.08	92	71.32	8	44.128	127	65.33	53	24.390	167	82.78	32	6.078	129
Aug. 8.2	35.16	93	71.40	48	44.001	134	64.80	46	24.223	171	83.10	2	5.949	137
18.2	34.23	90	70.92	100	43.867	135	64.34	38	24.052	171	83.08	38	5.812	138
28.2	33.33	84	69.92	151	43.732	128	63.96	28	23.881	163	82.70	74	5.674	131
Sept. 7.1	32.49	73	68.41	198	43.604	112	63.68	16	23.718	148	81.96	109	5.543	117
17.1	31.76	61	66.43	235	43.492	91	63.52	1	23.570	123	80.87	143	5.426	96
27.1	31.15	44	64.08	270	43.401	60	63.51	17	23.447	93	79.44	177	5.330	66
Oct. 7.1	30.71	23	61.38	289	43.341	21	63.68	35	23.354	53	77.67	208	5.264	28
17.0	30.48	3	58.49	299	43.320	22	64.03	56	23.301	8	75.59	235	5.236	14
27.0	30.45	19	55.50	298	43.342	69	64.59	81	23.293	42	73.24	259	5.250	61
Nov. 6.0	30.64	42	52.52	284	43.411	119	65.40	103	23.335	96	70.65	277	5.311	111
16.0	31.06	64	49.68	259	43.530	168	66.43	126	23.431	148	67.88	290	5.422	159
25.9	31.70	85	47.09	225	43.698	214	67.69	146	23.579	198	64.98	295	5.581	204
Dec. 5.9	32.55	101	44.84	181	43.912	254	69.15	164	23.777	244	62.03	292	5.785	245
15.9	33.56	116	43.03	131	44.166	286	70.79	175	24.021	281	59.11	280	6.030	278
25.8	34.72	126	41.72	76	44.452	310	72.54	183	24.302	313	56.31	257	6.308	303
35.8	35.98		40.96		44.762		74.37		24.615		53.74		6.611	
Mean Place	28.968		37.47		41.050		52.80		21.734		84.57		3.086	
Sec δ, Tan δ	5.102		−5.002		1.004		−0.093		1.127		+0.519		1.001	
$D_\psi a$, $D_\omega a$	+0.14		−0.26		+0.06		0.00		+0.05		+0.03		+0.08	
$D_\psi \delta$, $D_\omega \delta$	−0.3		−0.6		−0.3		−0.6		−0.3		−0.6		−0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	β Boötis. Mag. 3.6 Right Ascension.		β Boötis. Declination.		γ Scorpii. Mag. 3.4 Right Ascension.		γ Scorpii. Declination.		ψ Boötis. Mag. 4.7 Right Ascension.		ψ Boötis. Declination.		c Boötis. Mag. 5.0 Right Ascension.		c Boötis. Declination.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	14 58		+40 42		14 59		−24 57		15 0		+27 15		15 3		+25 11	
	s		″		s		″		s		″		s		″	
0.8	49.013	345	43.79	261	12.748	346	24.11	115	53.365	316	58.68	249	39.364	312	15.17	247
10.8	49.358	365	41.18	217	13.094	357	25.26	130	53.681	332	56.19	216	39.676	329	12.70	216
20.8	49.723	375	39.01	166	13.451	358	26.56	142	54.013	338	54.03	174	40.005	336	10.54	177
30.8	50.098	373	37.35	109	13.809	351	27.98	148	54.351	336	52.29	128	40.341	332	8.77	132
9.7	50.471	361	36.26	49	14.160	337	29.46	150	54.687	324	51.01	77	40.673	321	7.45	83
19.7	50.832	339	35.77	11	14.497	317	30.96	148	55.011	303	50.24	25	40.994	302	6.62	32
1.7	51.171	309	35.88	68	14.814	291	32.44	141	55.314	279	49.99	27	41.296	278	6.30	18
11.7	51.480	274	36.56	122	15.105	264	33.85	132	55.593	248	50.26	74	41.574	249	6.48	66
21.6	51.754	236	37.78	170	15.369	237	35.17	121	55.841	216	51.00	118	41.823	217	7.14	108
31.6	51.990	192	39.48	209	15.606	205	36.38	110	56.057	183	52.18	155	42.040	185	8.22	143
10.6	52.182	150	41.57	237	15.811	175	37.48	96	56.240	146	53.73	183	42.225	150	9.65	174
20.5	52.332	106	43.94	258	15.986	144	38.44	86	56.386	111	55.56	205	42.375	115	11.39	195
30.5	52.438	63	46.52	268	16.130	113	39.30	72	56.497	77	57.61	217	42.490	81	13.34	209
y 10.5	52.501	20	49.20	268	16.243	81	40.02	61	56.574	43	59.78	221	42.571	49	15.43	213
20.5	52.521	19	51.88	259	16.324	51	40.63	48	56.617	9	61.99	218	42.620	15	17.56	209
30.4	52.502	58	54.47	244	16.375	17	41.11	37	56.626	24	64.17	207	42.635	17	19.65	202
9.4	52.444	94	56.91	219	16.392	14	41.48	23	56.602	54	66.24	192	42.618	47	21.67	188
19.4	52.350	127	59.10	191	16.378	44	41.71	12	56.548	83	68.16	169	42.571	76	23.55	166
29.4	52.223	157	61.01	156	16.334	74	41.83	1	56.465	110	69.85	144	42.495	102	25.21	142
ly 9.3	52.066	181	62.57	118	16.260	100	41.82	15	56.355	133	71.29	114	42.393	127	26.63	114
19.3	51.885	202	63.75	77	16.160	124	41.67	30	56.222	153	72.43	82	42.266	146	27.77	83
29.3	51.683	218	64.52	34	16.036	140	41.37	42	56.069	168	73.25	49	42.120	162	28.60	52
g. 8.2	51.465	226	64.86	9	15.896	151	40.95	55	55.901	177	73.74	13	41.958	171	29.12	17
18.2	51.239	226	64.77	53	15.745	156	40.40	65	55.724	179	73.87	24	41.787	174	29.29	18
28.2	51.013	219	64.24	97	15.589	152	39.75	75	55.545	175	73.63	59	41.613	171	29.11	51
pt. 7.2	50.794	203	63.27	138	15.437	138	39.00	81	55.370	162	73.04	95	41.442	157	28.60	88
17.1	50.591	178	61.89	180	15.299	113	38.19	83	55.208	141	72.09	131	41.285	138	27.72	122
27.1	50.413	145	60.09	218	15.186	82	37.36	81	55.067	111	70.78	165	41.147	109	26.50	156
ct. 7.1	50.268	102	57.91	253	15.104	40	36.55	73	54.956	73	69.13	198	41.038	72	24.94	186
17.1	50.166	52	55.38	283	15.064	7	35.82	63	54.883	29	67.15	226	40.966	29	23.08	217
27.0	50.114	4	52.55	308	15.071	59	35.19	46	54.854	20	64.89	252	40.937	20	20.91	241
ov. 6.0	50.118	62	49.47	325	15.130	114	34.73	25	54.874	72	62.37	273	40.957	72	18.50	264
16.0	50.180	123	46.22	336	15.244	169	34.48	1	54.946	126	59.64	288	41.029	124	15.86	279
25.9	50.303	182	42.86	338	15.413	220	34.47	25	55.072	178	56.76	294	41.153	175	13.07	287
ec. 5.9	50.485	237	39.48	330	15.633	265	34.72	51	55.250	225	53.82	294	41.328	223	10.20	287
15.9	50.722	284	36.18	310	15.898	302	35.23	77	55.475	266	50.88	285	41.551	263	7.33	279
25.9	51.006	323	33.08	282	16.200	330	36.00	99	55.741	298	48.03	264	41.814	295	4.54	261
35.8	51.329		30.26		16.530		36.99		56.039		45.39		42.109		1.93	
n Place	49.182		62.45		12.512		23.19		53.334		74.23		39.326		30.10	
δ, Tan δ	*1.319*		*+0.860*		*1.103*		*−0.465*		1.125		+0.515		1.105		+0.470	
$D_a \alpha$	*+0.05*		*+0.04*		*+0.07*		*−0.02*		+0.05		+0.02		+0.05		+0.02	
$D_a \delta$	*−0.3*		*−0.7*		*−0.3*		*−0.7*		−0.3		−0.7		−0.3		−0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ζ Lupi. Mag. 3.5 Right Ascension.		ζ Lupi. Declination.		ι Librae. Mag. 4.7 Right Ascension.		ι Librae. Declination.		3 Serpentis. Mag. 5.4 Right Ascension.		3 Serpentis. Declination.		γ Triang. Mag. Right Ascension.	
	h m		° ′		h m		° ′		h m		° ′		h m	
	15 6		−51 46		15 7		−19 28		15 11		+ 5 14		15 11	
	s		″		s		″		s		″		s	
Jan. 0.9	18.760		57.26		29.405		45.09		3.861		38.97		7.62	
10.8	19.229	469	57.34	8	29.735	330	46.35	126	4.163	302	36.93	204	8.34	72
20.8	19.718	489	57.82	48	30.077	342	47.73	138	4.479	316	35.01	192	9.09	75
30.8	20.213	495	58.67	85	30.422	345	49.17	144	4.799	320	33.30	171	9.87	78
Feb. 9.7	20.701	488	59.86	119	30.763	341	50.63	146	5.116	317	31.84	146	10.64	77
19.7	21.173	472	61.34	148	31.091	328	52.03	140	5.422	306	30.70	114	11.39	75
Mar. 1.7	21.620	447	63.07	173	31.399	308	53.35	132	5.712	290	29.89	81	12.10	71
11.7	22.037	417	64.99	192	31.686	287	54.56	121	5.980	268	29.42	47	12.77	67
21.6	22.417	380	67.07	208	31.947	261	55.63	107	6.223	243	29.30	12	13.39	62
31.6	22.757	340	69.25	218	32.181	234	56.56	93	6.439	216	29.51	21	13.94	55
Apr. 10.6	23.056	299	71.49	224	32.385	204	57.34	78	6.629	190	30.00	49	14.42	48
20.6	23.309	253	73.76	227	32.561	176	57.97	63	6.788	159	30.75	75	14.83	41
30.5	23.517	208	76.00	224	32.708	147	58.47	50	6.920	132	31.69	94	15.16	33
May 10.5	23.677	160	78.19	219	32.825	117	58.85	38	7.021	101	32.77	108	15.39	23
20.5	23.788	111	80.27	208	32.912	87	59.10	25	7.092	71	33.96	119	15.54	15
30.4	23.849	61	82.22	195	32.966	54	59.26	16	7.137	45	35.19	123	15.60	6
June 9.4	23.860	11	83.99	177	32.991	25	59.33	7	7.150	13	36.41	122	15.58	2
19.4	23.821	39	85.53	154	32.986	5	59.30	3	7.135	15	37.58	117	15.47	11
29.4	23.734	87	86.82	129	32.950	36	59.19	11	7.093	42	38.70	112	15.26	21
July 9.3	23.602	132	87.83	101	32.883	67	59.00	19	7.024	69	39.71	101	14.99	27
19.3	23.430	172	88.51	68	32.792	91	58.72	28	6.931	93	40.59	88	14.65	34
29.3	23.223	207	88.84	33	32.677	115	58.36	36	6.817	114	41.33	74	14.26	39
Aug. 8.3	22.991	232	88.82	2	32.545	132	57.93	43	6.686	131	41.92	59	13.82	44
18.2	22.743	248	88.42	40	32.400	145	57.43	50	6.544	142	42.34	42	13.36	46
28.2	22.490	253	87.66	76	32.249	151	56.86	57	6.396	148	42.56	22	12.89	47
Sept. 7.2	22.244	246	86.56	110	32.102	147	56.26	60	6.250	146	42.60	4	12.44	45
17.1	22.021	223	85.16	140	31.965	137	55.65	61	6.113	137	42.41	19	12.02	42
27.1	21.831	190	83.49	167	31.850	115	55.05	60	5.996	117	42.02	39	11.67	35
Oct. 7.1	21.690	141	81.64	185	31.765	85	54.52	53	5.904	92	41.39	63	11.39	28
17.1	21.607	83	79.66	198	31.716	49	54.07	45	5.847	57	40.54	85	11.20	19
27.0	21.593	14	77.65	201	31.714	2	53.77	30	5.831	16	39.43	111	11.14	6
Nov. 6.0	21.655	62	75.69	196	31.763	49	53.62	15	5.861	30	38.10	133	11.19	5
16.0	21.794	139	73.87	182	31.864	101	53.68	6	5.940	79	36.53	157	11.36	17
26.0	22.009	215	72.27	160	32.017	153	53.98	30	6.069	129	34.77	176	11.67	31
Dec. 5.9	22.298	289	70.96	131	32.221	204	54.51	53	6.246	177	32.84	193	12.09	42
15.9	22.650	352	69.98	98	32.469	248	55.27	76	6.466	220	30.81	203	12.61	52
25.9	23.056	406	69.40	58	32.754	285	56.25	98	6.723	257	28.72	209	13.22	61
35.8	23.503	447	69.21	19	33.068	314	57.42	117	7.009	286	26.64	208	13.90	68
Mean Place	18.818		62.64		29.193		42.58		3.707		48.40		8.361	
Sec δ, Tan δ	1.617		−1.270		1.061		−0.354		1.004		+0.092		2.714	
$D_\psi a$, $D_\omega a$	+0.08		−0.06		+0.07		−0.02		+0.06		0.00		+0.11	
$D_\psi \delta$, $D_\omega \delta$	−0.3		−0.7		−0.3		−0.7		−0.3		−0.7		−0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

...ton ...nce.	δ Boötis. Mag. 3.5				β Libræ. Mag. 2.7				γ Ursæ Minoris. Mag. 3.1				μ Boötis pr. Mag. 4.5			
	Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.	
	h m 15 12		° ′ +33 36		h m 15 12		° ′ −9 4		h m 15 20		° ′ +72 7		h m 15 21		° ′ +37 39	
	s		″		s		″		s		″		s		″	
0.9	9.271		69.02		32.483		44.12		48.51		23.92		21.019		46.52	
10.8	9.590	319	66.39	263	32.795	312	45.73	161	49.12	61	21.26	266	21.339	320	43.82	270
20.8	9.929	339	64.14	225	33.120	325	47.34	161	49.80	68	19.13	213	21.684	345	41.50	232
30.8	10.279	350	62.35	179	33.449	329	48.91	157	50.54	74	17.62	151	22.041	357	39.66	184
9.7	10.629	350	61.07	128	33.774	325	50.37	146	51.31	77	16.77	85	22.401	360	38.36	130
19.7	10.969	340	60.34	73	34.088	314	51.67	130	52.07	76	16.60	17	22.753	352	37.63	73
1.7	11.292	323	60.17	17	34.384	296	52.77	110	52.81	74	17.12	52	23.090	337	37.49	14
11.7	11.589	297	60.56	39	34.659	275	53.66	89	53.49	68	18.28	116	23.402	312	37.95	46
21.6	11.857	268	61.48	92	34.910	251	54.32	66	54.10	61	20.03	175	23.686	284	38.94	99
31.6	12.092	235	62.86	138	35.136	226	54.76	44	54.62	52	22.30	227	23.935	249	40.13	149
10.6	12.290	198	64.64	178	35.334	198	54.98	22	55.03	41	24.98	268	24.147	212	42.33	190
20.6	12.451	161	66.74	210	35.504	170	55.02	4	55.33	30	27.98	300	24.320	173	44.57	224
30.5	12.574	123	69.05	231	35.646	142	54.90	12	55.51	18	31.16	318	24.452	132	47.04	247
10.5	12.658	84	71.50	245	35.759	113	54.63	27	55.56	5	34.42	326	24.545	93	49.67	263
20.5	12.706	48	73.99	249	35.843	84	54.26	37	55.50	6	37.65	323	24.596	51	52.33	266
30.4	12.715	9	76.44	245	35.899	56	53.82	44	55.32	18	40.74	309	24.608	12	54.95	262
ne 9.4	12.689	26	78.78	234	35.924	25	53.32	50	55.04	28	43.61	287	24.580	28	57.46	251
19.4	12.629	60	80.93	215	35.920	4	52.78	54	54.65	39	46.16	255	24.515	65	59.78	232
29.4	12.537	92	82.84	191	35.886	34	52.23	55	54.18	47	48.33	217	24.416	99	61.83	205
ly 9.3	12.414	123	84.45	161	35.825	61	51.67	56	53.62	56	50.07	174	24.284	132	63.58	175
19.3	12.267	147	85.72	127	35.739	86	51.11	56	53.01	61	51.34	127	24.123	161	64.99	141
29.3	12.096	171	86.65	93	35.630	109	50.57	54	52.35	66	52.09	75	23.939	184	66.00	101
g. 8.3	11.909	187	87.19	54	35.503	127	50.06	51	51.66	69	52.33	24	23.736	203	66.61	61
18.2	11.711	198	87.33	14	35.364	139	49.58	48	50.95	71	52.04	29	23.519	217	66.79	18
28.2	11.509	202	87.07	26	35.218	146	49.14	44	50.24	71	51.23	81	23.297	222	66.55	24
pt. 7.2	11.310	199	86.40	67	35.074	144	48.77	37	49.55	69	49.90	133	23.077	220	65.88	67
17.1	11.122	188	85.33	107	34.940	134	48.48	29	48.90	65	48.08	182	22.870	207	64.78	110
27.1	10.957	165	83.87	146	34.826	114	48.31	17	48.30	60	45.81	227	22.682	188	63.28	150
ct. 7.1	10.821	136	82.05	182	34.738	88	48.25	6	47.78	52	43.13	268	22.524	158	61.39	189
17.1	10.723	98	79.87	218	34.686	52	48.35	10	47.34	44	40.08	305	22.405	119	59.12	227
27.0	10.670	53	77.37	250	34.677	9	48.65	30	47.00	34	36.73	335	22.332	73	56.53	259
ov. 6.0	10.670	0	74.62	275	34.715	38	49.13	48	46.78	22	33.14	359	22.311	21	53.67	286
16.0	10.723	53	71.64	298	34.803	88	49.83	70	46.69	9	29.41	373	22.347	36	50.58	309
26.0	10.833	110	68.53	311	34.941	138	50.75	92	46.74	5	25.63	378	22.443	96	47.35	323
Dec. 5.9	10.998	165	65.36	317	35.128	187	51.88	113	46.91	17	21.89	374	22.596	153	44.06	329
15.9	11.214	216	62.21	315	35.359	231	53.18	130	47.22	31	18.31	358	22.804	208	40.79	327
25.9	11.476	262	59.20	301	35.626	267	54.64	146	47.67	45	14.99	332	23.060	256	37.66	313
35.8	11.775	299	56.40	280	35.922	296	56.19	155	48.21	54	12.07	292	23.357	297	34.78	288
...an Place	9.406		85.59		32.293		38.73		51.060		45.49		21.295		63.51	
...c δ, Tan δ	1.201		+0.665		1.013		−0.160		3.258		+3.101		1.263		+0.772	
..., $D_\omega \alpha$	+0.05		+0.03		+0.06		−0.01		0.00		+0.13		+0.05		+0.03	
$D_\omega \delta$	−0.3		−0.7		−0.3		−0.7		−0.3		−0.8		−0.3		−0.8	

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FOR THE UPPER TRANSIT AT WASHINGTON.

hington Time.	ν^1 Boötis. Mag. 5.2 Right Ascension.		Declination.		γ Lupi (*mean*). Mag. 3.0 Right Ascension.		Declination.		γ Libræ. Mag. 4.0 Right Ascension.		Declination.		α Coronæ Borealis. Mag. 2.3 Right Ascension.		Declination.	
	h m 15 27		° ′ +41 6		h m 15 29		° ′ −40 53		h m 15 30		° ′ −14 30		h m 15 31		° ′ +26 59	
	s		″		s		″		s		″		s		″	
L 0.9	56.477		38.05		36.230		17.53		52.973		52.20		10.242		21.53	
10.8	56.800	323	35.26	279	36.615	385	17.78	25	53.284	311	53.51	131	10.539	297	18.94	259
20.8	57.151	351	32.89	237	37.022	407	18.32	54	53.609	325	54.89	138	10.857	318	16.66	228
30.8	57.517	366	31.02	187	37.437	415	19.13	81	53.942	333	56.27	138	11.188	331	14.75	191
b. 9.8	57.889	372	29.69	133	37.851	414	20.17	104	54.275	333	57.61	134	11.521	333	13.31	144
19.7	58.255	366	28.95	74	38.255	404	21.41	124	54.599	324	58.86	125	11.848	327	12.38	93
r. 1.7	58.605	350	28.83	12	38.643	388	22.79	138	54.907	308	59.96	110	12.162	314	11.96	42
11.7	58.934	329	29.32	49	39.009	366	24.28	149	55.199	292	60.92	96	12.455	293	12.07	11
21.7	59.232	298	30.36	104	39.347	338	25.84	156	55.469	270	61.70	78	12.724	269	12.68	61
31.6	59.496	264	31.92	156	39.656	309	27.45	161	55.713	244	62.30	60	12.965	241	13.75	107
r. 10.6	59.721	225	33.92	200	39.934	278	29.08	163	55.932	219	62.73	43	13.175	210	15.22	147
20.6	59.906	185	36.25	233	40.177	243	30.70	162	56.126	194	62.99	26	13.353	178	17.02	180
30.5	60.047	141	38.84	259	40.385	208	32.28	158	56.290	164	63.11	12	13.497	144	19.07	205
y 10.5	60.145	98	41.58	274	40.555	170	33.81	153	56.427	137	63.12	1	13.606	109	21.28	221
20.5	60.200	55	44.37	279	40.686	131	35.27	146	56.533	106	63.03	9	13.680	74	23.57	229
30.5	60.212	12	47.13	276	40.777	91	36.63	136	56.609	76	62.84	19	13.719	39	25.87	230
ne 9.4	60.183	29	49.76	263	40.826	49	37.87	124	56.654	45	62.60	24	13.724	5	28.10	223
19.4	60.113	70	52.19	243	40.832	6	38.95	108	56.666	12	62.32	28	13.695	29	30.18	208
29.4	60.006	107	54.35	216	40.797	35	39.86	91	56.647	19	61.99	33	13.633	62	32.07	189
ly 9.4	59.865	141	56.21	186	40.722	75	40.56	70	56.598	49	61.62	37	13.541	92	33.72	165
19.3	59.692	173	57.69	148	40.610	112	41.06	50	56.519	79	61.23	39	13.420	121	35.10	138
29.3	59.493	199	58.77	108	40.465	145	41.31	25	56.416	103	60.82	41	13.275	145	36.16	106
ıg. 8.3	59.274	219	59.42	65	40.292	173	41.29	2	56.289	127	60.38	44	13.109	166	36.88	72
18.2	59.041	233	59.64	22	40.101	191	41.00	29	56.147	142	59.93	45	12.929	180	37.25	37
28.2	58.801	240	59.41	23	39.899	202	40.46	54	55.996	151	59.48	45	12.742	187	37.26	1
pt. 7.2	58.562	239	58.73	68	39.697	202	39.66	80	55.844	152	59.03	45	12.554	188	36.90	36
17.2	58.335	227	57.61	112	39.507	190	38.65	101	55.699	145	58.61	42	12.374	180	36.17	73
27.1	58.129	206	56.06	155	39.340	167	37.43	122	55.572	127	58.24	37	12.212	162	35.07	110
ct. 7.1	57.952	177	54.10	196	39.208	132	36.08	135	55.470	102	57.94	30	12.075	137	33.63	144
17.1	57.814	138	51.77	233	39.122	86	34.64	144	55.403	67	57.77	17	11.973	102	31.83	180
27.1	57.724	90	49.10	267	39.090	32	33.19	145	55.378	25	57.73	4	11.912	61	29.72	211
ov. 6.0	57.688	36	46.14	296	39.120	30	31.79	140	55.401	23	57.85	12	11.899	13	27.33	239
16.0	57.710	22	42.96	318	39.214	94	30.52	127	55.475	74	58.17	32	11.939	40	24.69	264
26.0	57.794	84	39.63	333	39.372	158	29.43	109	55.601	126	58.69	52	12.032	93	21.89	280
ec. 5.9	57.939	145	36.24	339	39.593	221	28.57	86	55.776	175	59.43	74	12.178	146	18.98	291
15.9	58.141	202	32.88	336	39.870	277	27.99	58	55.998	222	60.35	92	12.373	195	16.03	295
25.9	58.394	253	29.66	322	40.195	325	27.72	27	56.259	261	61.46	111	12.611	238	13.15	288
35.9	58.693	299	26.70	296	40.560	365	27.76	4	56.551	292	62.70	124	12.887	276	10.43	272
an Place	56.882		55.34		36.230		20.03		52.856		48.31		10.392		35.81	
δ, Tan δ	*1.327*		*+0.873*		*1.323*		−0.866		1.033		−0.259		1.122		+0.509	
$D_\omega \alpha$	*+0.04*		*+0.04*		*+0.08*		−0.04		+0.07		−0.01		+0.05		+0.02	
$D_\omega \delta$	*−0.2*		*−0.8*		*−0.2*		−0.8		−0.2		−0.8		−0.2		−0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ζ Cor. Bor. *seq.* Mag. 5.1 Right Ascension.		ζ Cor. Bor. Declination.		α Serpentis. Mag. 2.8 Right Ascension.		α Serpentis. Declination.		β Serpentis. Mag. 3.7 Right Ascension.		β Serpentis. Declination.		κ Serpent Mag. 4 Right Ascension.		κ Serpent D
	h m 15 36		° ′ +36 53		h m 15 40		° ′ + 6 40		h m 15 42		° ′ +15 40		h m 15 45		+
	s		″		s		″		s		″		s		′
Jan. 0.9	14.790		60.67		10.713		60.30		21.342		39.38		0.051		37
10.9	15.097	307	57.90	277	10.997	284	58.24	206	21.626	284	37.04	234	0.332	281	35
20.8	15.429	332	55.50	240	11.302	305	56.31	193	21.929	303	34.92	212	0.636	304	32
30.8	15.779	350	53.55	195	11.616	314	54.60	171	22.244	315	33.07	185	0.951	315	31
Feb. 9.8	16.135	356	52.14	141	11.932	316	53.14	146	22.562	318	31.58	149	1.271	320	29
19.7	16.486	351	51.28	86	12.242	310	52.00	114	22.875	313	30.49	109	1.586	315	2
Mar. 1.7	16.825	339	51.01	27	12.539	297	51.22	78	23.176	301	29.84	65	1.890	304	27
11.7	17.143	318	51.33	32	12.820	281	50.79	43	23.462	286	29.63	21	2.178	288	27
21.7	17.434	291	52.20	87	13.080	260	50.74	5	23.726	264	29.85	22	2.445	267	27
31.6	17.695	261	53.58	138	13.318	238	51.03	29	23.966	240	30.48	63	2.689	244	2
Apr. 10.6	17.921	226	55.40	182	13.530	212	51.63	60	24.179	213	31.46	98	2.905	216	2
20.6	18.110	189	57.58	218	13.716	186	52.49	86	24.365	186	32.76	130	3.093	188	3
30.6	18.260	150	60.01	243	13.873	157	53.56	107	24.521	156	34.29	153	3.250	157	3
May 10.5	18.369	109	62.63	262	14.002	129	54.80	124	24.647	126	36.01	172	3.377	127	3
20.5	18.438	69	65.31	268	14.102	100	56.14	134	24.742	95	37.82	181	3.472	95	3
30.5	18.467	29	67.98	267	14.170	68	57.53	139	24.804	62	39.66	184	3.534	62	3
June 9.4	18.457	10	70.55	257	14.208	38	58.93	140	24.834	30	41.48	182	3.564	30	4
19.4	18.409	48	72.95	240	14.215	7	60.28	135	24.833	1	43.22	174	3.561	3	4
29.4	18.324	85	75.11	216	14.191	24	61.55	127	24.799	34	44.83	161	3.524	37	4
July 9.4	18.204	120	76.99	188	14.137	54	62.70	115	24.735	64	46.28	145	3.457	67	4
19.3	18.053	151	78.52	153	14.055	82	63.72	102	24.643	92	47.51	123	3.361	96	4
29.3	17.877	176	79.67	115	13.947	108	64.58	86	24.524	119	48.53	102	3.238	123	4
Aug. 8.3	17.679	198	80.43	76	13.819	128	65.26	68	24.385	139	49.29	76	3.094	144	4
18.3	17.464	215	80.78	35	13.674	145	65.77	51	24.229	156	49.80	51	2.933	161	4
28.2	17.242	222	80.70	8	13.519	155	66.06	29	24.062	167	50.01	21	2.762	171	4
Sept. 7.2	17.019	223	80.18	52	13.362	157	66.15	9	23.894	168	49.95	6	2.588	174	4
17.2	16.805	214	79.25	93	13.210	152	66.01	14	23.732	162	49.59	36	2.420	168	4
27.1	16.609	196	77.89	136	13.073	137	65.65	36	23.585	147	48.94	65	2.265	155	4
Oct. 7.1	16.440	169	76.13	176	12.959	114	65.04	61	23.458	127	47.97	97	2.133	132	4
17.1	16.308	132	74.00	213	12.877	82	64.20	84	23.363	95	46.72	125	2.033	100	4
27.1	16.220	88	71.52	248	12.834	43	63.10	110	23.308	55	45.17	155	1.972	61	4
Nov. 6.0	16.183	37	68.76	276	12.835	1	61.77	133	23.299	9	43.37	180	1.956	16	4
16.0	16.201	18	65.75	301	12.885	50	60.20	157	23.338	39	41.33	204	1.990	34	4
26.0	16.278	77	62.58	317	12.984	99	58.44	176	23.428	90	39.09	224	2.075	85	3
Dec. 6.0	16.413	135	59.32	326	13.133	149	56.51	193	23.568	140	36.70	239	2.210	135	3
15.9	16.604	191	56.07	325	13.327	194	54.47	204	23.755	187	34.22	248	2.393	183	3
25.9	16.844	240	52.92	315	13.560	233	52.37	210	23.984	229	31.74	248	2.619	226	30
35.9	17.125	281	49.99	293	13.826	266	50.28	209	24.247	263	29.33	241	2.880	261	27
Mean Place	15.152		76.73		10.702		69.49		21.414		50.67		0.164		49
Sec δ, Tan δ	1.250		+0.751		1.007		+0.117		1.039		+0.281		1.054		+0
Dψ a, Dω a	+0.04		+0.03		+0.06		0.00		+0.05		+0.01		+0.05		
Dψ δ, Dω δ	−0.2		−0.8		−0.2		−0.8		−0.2		−0.8		−0.2		

FOR THE UPPER TRANSIT AT WASHINGTON.

...hington ...n Time.	μ Serpentis. Mag. 3.6 Right Ascension.		Declination.		12 H. Draconis. Mag. 5.1 Right Ascension.		Declination.		ε Serpentis. Mag. 3.8 Right Ascension.		Declination.		ζ Ursæ Minoris. Mag. 4.3 Right Ascension.		Declination.	
	h m 15 45		° ′ −3 10		h m 15 45		° ′ +62 50		h m 15 46		° ′ +4 43		h m 15 46		° ′ +78 2	
	s		″		s		″		s		″		s		″	
...a. 0.9	17.245	287	44.04	170	22.20	41	61.57	296	40.620	282	28.30	198	54.64	75	41.52	280
10.9	17.532	307	45.74	164	22.61	48	58.61	247	40.902	302	26.32	187	55.39	89	38.72	231
20.8	17.839	316	47.38	155	23.09	51	56.14	190	41.204	312	24.45	168	56.28	100	36.41	173
30.8	18.155	318	48.93	139	23.60	53	54.24	129	41.516	315	22.77	145	57.28	106	34.68	110
...b. 9.8	18.473	313	50.32	117	24.13	54	52.95	62	41.831	310	21.32	114	58.34	109	33.58	42
19.7	18.786	300	51.49	91	24.67	53	52.33	8	42.141	299	20.18	81	59.43	107	33.16	25
...r. 1.7	19.086	286	52.40	64	25.20	51	52.41	73	42.440	284	19.37	47	60.50	102	33.41	92
11.7	19.372	266	53.04	38	25.71	46	53.14	136	42.724	263	18.90	12	61.52	94	34.33	153
21.7	19.638	244	53.42	9	26.17	41	54.50	193	42.987	243	18.78	22	62.46	82	35.86	207
31.6	19.882	220	53.51	17	26.58	34	56.43	240	43.230	217	19.00	51	63.28	68	37.93	253
...pr. 10.6	20.102	195	53.34	37	26.92	27	58.83	277	43.447	192	19.51	78	63.96	50	40.46	288
20.6	20.297	167	52.97	55	27.19	20	61.60	305	43.639	164	20.29	99	64.46	34	43.34	312
30.6	20.464	141	52.42	71	27.39	12	64.65	320	43.803	137	21.28	115	64.80	14	46.46	325
...ay 10.5	20.605	110	51.71	80	27.51	4	67.85	326	43.940	106	22.43	125	64.94	2	49.71	327
20.5	20.715	81	50.91	87	27.55	3	71.11	320	44.046	76	23.68	131	64.92	21	52.98	319
30.5	20.796	51	50.04	89	27.52	11	74.31	304	44.122	46	24.99	132	64.71	39	56.17	299
...ne 9.4	20.847	18	49.15	89	27.41	19	77.35	281	44.168	14	26.31	128	64.32	54	59.16	273
19.4	20.865	13	48.26	87	27.22	24	80.16	249	44.182	18	27.59	122	63.78	68	61.89	240
29.4	20.852	43	47.39	82	26.98	30	82.65	210	44.164	48	28.81	111	63.10	82	64.29	199
...ly 9.4	20.809	74	46.57	75	26.68	36	84.75	167	44.116	77	29.92	99	62.28	92	66.28	154
19.3	20.735	99	45.82	66	26.32	40	86.42	121	44.039	103	30.91	85	61.36	100	67.82	105
29.3	20.636	123	45.16	58	25.92	42	87.63	71	43.936	126	31.76	68	60.36	107	68.87	55
...ug. 8.3	20.513	139	44.58	49	25.50	45	88.34	20	43.810	143	32.44	52	59.29	110	69.42	3
18.3	20.374	150	44.09	38	25.05	47	88.54	32	43.667	154	32.96	34	58.19	111	69.45	51
28.2	20.224	154	43.71	25	24.58	46	88.22	84	43.513	158	33.30	13	57.08	111	68.94	101
...ept. 7.2	20.070	149	43.46	12	24.12	44	87.38	134	43.355	153	33.43	6	55.97	107	67.93	150
17.2	19.921	136	43.34	2	23.68	42	86.04	183	43.202	139	33.37	29	54.90	100	66.43	198
27.1	19.785	112	43.36	19	23.26	37	84.21	229	43.063	117	33.08	50	53.90	90	64.45	241
...ct. 7.1	19.673	81	43.55	37	22.89	32	81.92	270	42.946	86	32.58	73	53.00	80	62.04	279
17.1	19.592	41	43.92	56	22.57	25	79.22	305	42.860	48	31.85	97	52.20	64	59.25	314
27.1	19.551	3	44.48	77	22.32	16	76.17	335	42.812	3	30.88	122	51.56	50	56.11	340
Nov. 6.0	19.554	51	45.25	97	22.16	8	72.82	358	42.809	45	29.66	142	51.06	31	52.71	361
16.0	19.605	102	46.22	118	22.08	1	69.24	370	42.854	95	28.24	164	50.75	12	49.10	370
26.0	19.707	151	47.40	136	22.09	10	65.54	374	42.949	144	26.60	180	50.63	8	45.40	370
Dec. 6.0	19.858	197	48.76	151	22.19	20	61.80	367	43.093	188	24.80	193	50.71	28	41.70	358
15.9	20.055	235	50.27	163	22.39	29	58.13	348	43.281	229	22.87	200	50.99	48	38.12	338
25.9	20.290	269	51.90	168	22.68	38	54.65	319	43.510	263	20.87	200	51.47	66	34.74	305
35.9	20.559		53.58		23.06		51.46		43.773		18.87		52.13		31.69	
...ean Place	17.206		37.38		23.868		80.66		40.625		36.86		59.691		61.37	
...ec δ, Tan δ	1.002		−0.056		*2.192*		*+1.950*		1.003		+0.083		4.829		+4.724	
...a, $D_\omega\alpha$	+0.06		0.00		+0.02		+0.07		+0.06		0.00		−0.04		+0.17	
...δ, $D_\omega\delta$	−0.2		−0.8		−0.2		−0.8		−0.2		−0.8		−0.2		−0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	κ Herculis. Mag. 5.3 Right Ascension.		κ Herculis. Declination.		Groombridge 2320. Mag. 5.4 Right Ascension.		Groombridge 2320. Declination.		φ Herculis. Mag. 4.3 Right Ascension.		φ Herculis. Declination.		δ¹ Apo[dis] Mag. [4] Right Ascension.	
	h m 16 4		° ′ +17 15		h m 16 6		° ′ +68 1		h m 16 6		° ′ +45 8		h m 16 7	
	s		″		s		″		s		″		s	
Jan. 0.9	19.448	268	50.62	240	2.89	43	25.14	307	8.463	296	51.56	300	50.83	112
10.9	19.716	291	48.22	219	3.32	52	22.07	262	8.759	332	48.56	264	51.95	123
20.8	20.007	308	46.03	190	3.84	57	19.45	207	9.091	361	45.92	217	53.18	131
30.8	20.315	313	44.13	155	4.41	62	17.38	145	9.452	376	43.75	163	54.49	136
Feb. 9.8	20.628	314	42.58	114	5.03	63	15.93	79	9.828	382	42.12	102	55.85	138
19.8	20.942	306	41.44	69	5.66	64	15.14	12	10.210	376	41.10	39	57.23	136
Mar. 1.7	21.248	294	40.75	23	6.30	60	15.02	57	10.586	362	40.71	24	58.59	133
11.7	21.542	275	40.52	22	6.90	57	15.59	122	10.948	338	40.95	85	59.92	126
21.7	21.817	256	40.74	64	7.47	52	16.81	180	11.286	308	41.80	142	61.18	116
31.6	22.073	229	41.38	104	7.99	44	18.61	232	11.594	273	43.22	191	62.34	107
Apr. 10.6	22.302	204	42.42	136	8.43	36	20.93	272	11.867	235	45.13	233	63.41	94
20.6	22.506	176	43.78	162	8.79	27	23.65	303	12.102	191	47.46	265	64.35	81
30.6	22.682	146	45.40	182	9.06	17	26.68	322	12.293	145	50.11	286	65.16	65
May 10.5	22.828	114	47.22	194	9.23	7	29.90	332	12.438	98	52.97	298	65.81	49
20.5	22.942	82	49.16	200	9.30	2	33.22	331	12.536	50	55.95	301	66.30	32
30.5	23.024	48	51.16	198	9.28	11	36.53	318	12.586	3	58.96	294	66.62	13
June 9.5	23.072	14	53.14	190	9.17	21	39.71	295	12.589	44	61.90	278	66.75	3
19.4	23.086	21	55.04	179	8.96	29	42.66	269	12.545	89	64.68	255	66.72	22
29.4	23.065	52	56.83	161	8.67	37	45.35	233	12.456	132	67.23	224	66.50	38
July 9.4	23.013	84	58.44	141	8.30	44	47.68	191	12.324	171	69.47	191	66.12	53
19.3	22.929	114	59.85	116	7.86	48	49.59	143	12.153	207	71.38	151	65.59	67
29.3	22.815	136	61.01	90	7.38	55	51.02	97	11.946	234	72.89	107	64.92	80
Aug. 8.3	22.679	158	61.91	63	6.83	57	51.99	44	11.712	257	73.96	62	64.12	88
18.3	22.521	172	62.54	34	6.26	59	52.43	6	11.455	271	74.58	16	63.24	92
28.2	22.349	177	62.88	2	5.67	59	52.37	60	11.184	276	74.74	31	62.32	94
Sept. 7.2	22.172	175	62.90	26	5.08	58	51.77	112	10.908	274	74.43	78	61.38	92
17.2	21.997	164	62.64	59	4.50	56	50.65	160	10.634	257	73.65	126	60.46	86
27.2	21.833	143	62.05	91	3.94	50	49.05	210	10.377	233	72.39	170	59.60	74
Oct. 7.1	21.690	114	61.14	121	3.44	45	46.95	252	10.144	196	70.69	213	58.86	61
17.1	21.576	77	59.93	151	2.99	37	44.43	291	9.948	152	68.56	251	58.25	43
27.1	21.499	32	58.42	179	2.62	28	41.52	325	9.796	98	66.05	284	57.82	22
Nov. 6.0	21.467	15	56.63	204	2.34	17	38.27	349	9.698	39	63.21	313	57.60	1
16.0	21.482	65	54.59	226	2.17	7	34.78	366	9.659	24	60.08	332	57.59	22
26.0	21.547	116	52.33	241	2.10	5	31.12	373	9.683	90	56.76	345	57.81	44
Dec. 6.0	21.663	165	49.92	250	2.15	16	27.39	369	9.773	153	53.31	346	58.25	66
15.9	21.828	208	47.42	253	2.31	27	23.70	354	9.926	213	49.85	338	58.91	84
25.9	22.036	245	44.89	248	2.58	38	20.16	328	10.139	265	46.47	318	59.75	103
35.9	22.281		42.41		2.96		16.88		10.404		43.29		60.78	
Mean Place	19.637		61.45		5.472		43.00		9.264		67.12		53.722	
Sec δ, Tan δ	1.047		+0.311		2.672		+2.478		1.418		+1.005		5.012	
Dψ α, Dω α	+0.05		+0.01		0.00		+0.08		+0.04		+0.03		+0.18	
Dψ δ, Dω δ	−0.2		−0.9		−0.2		−0.9		−0.2		−0.9		−0.2	

FOR THE UPPER TRANSIT AT

Washington Mean Time.	
Jan.	0.9
	10.9
	20.8
	30.8
Feb.	9.8
	19.8
Mar.	1.7
	11.7
	21.7
	31.7
Apr.	10.6
	20.6
	30.6
May	10.5
	20.5
	30.5
June	9.5
	19.4
	29.4
July	9.4
	19.4
	29.3
Aug.	8.3
	18.3
	28.2
Sept.	7.2
	17.2
	27.2
Oct.	7.1
	17.1
	27.1
Nov.	6.1
	16.0
	26.0
Dec.	6.0
	15.9
	25.9
	35.9
Mean Place. See δ, T.m δ	
$D_5 a$, $D_6 a$	
$D_5 \delta$, $D_6 \delta$	

FOR THE UPPER TRANSIT AT WASHINGTON.

ington Time.	η Ursæ Minoris. Mag. 5.0				γ Apodis. Mag. 3.9				ω Herculis. Mag. 4.5				η Draconis. Mag. 2.9			
	Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.	
	h m 16 19		° ′ +75 56		h m 16 20		° ′ −78 42		h m 16 21		° ′ +14 13		h m 16 22		° ′ +61 41	
	s		″		s		″		s		″		s		″	
0.9	49.88	55	32.61	307	37.53	109	41.62	184	34.620	256	15.25	229	49.92	34	50.46	319
10.9	50.43	69	29.54	264	38.62	122	39.78	140	34.876	279	12.96	210	50.26	41	47.27	280
20.9	51.12	79	26.90	213	39.84	132	38.38	92	35.155	297	10.86	188	50.67	46	44.47	229
30.8	51.91	88	24.77	153	41.16	138	37.46	42	35.452	308	8.98	155	51.13	49	42.18	171
b. 9.8	52.79	92	23.24	87	42.54	140	37.04	6	35.760	310	7.43	118	51.62	51	40.47	107
19.8	53.71	93	22.37	20	43.94	139	37.10	53	36.070	304	6.25	76	52.13	52	39.40	38
r. 1.7	54.64	91	22.17	49	45.33	137	37.63	99	36.374	296	5.49	33	52.65	51	39.02	29
11.7	55.55	87	22.66	112	46.70	131	38.62	139	36.670	281	5.16	10	53.16	48	39.31	96
21.7	56.42	78	23.78	172	48.01	123	40.01	178	36.951	262	5.26	52	53.64	44	40.27	157
31.7	57.20	67	25.50	223	49.24	113	41.79	211	37.213	242	5.78	91	54.08	39	41.84	211
r. 10.6	57.87	55	27.73	267	50.37	101	43.90	240	37.455	217	6.69	123	54.47	33	43.95	255
20.6	58.42	42	30.40	300	51.38	87	46.30	263	37.672	192	7.92	149	54.80	26	46.50	289
30.6	58.84	26	33.40	320	52.25	72	48.93	280	37.864	162	9.41	169	55.06	19	49.39	316
y 10.6	59.10	11	36.60	332	52.97	56	51.73	291	38.026	133	11.10	183	55.25	11	52.55	329
20.5	59.21	4	39.92	332	53.53	38	54.64	297	38.159	101	12.93	190	55.36	4	55.84	331
30.5	59.17	20	43.24	321	53.91	21	57.61	294	38.260	66	14.83	190	55.40	3	59.15	325
ne 9.5	58.97	34	46.45	302	54.12	2	60.55	284	38.326	33	16.73	185	55.37	10	62.40	308
19.4	58.63	47	49.47	276	54.14	17	63.39	267	38.359	1	18.58	175	55.27	18	65.48	284
29.4	58.16	61	52.23	240	53.97	34	66.06	244	38.358	37	20.33	159	55.09	24	68.32	252
ly 9.4	57.55	70	54.63	201	53.63	51	68.50	212	38.321	69	21.92	141	54.85	30	70.84	214
19.4	56.85	80	56.64	156	53.12	65	70.62	174	38.252	99	23.33	119	54.55	35	72.98	171
29.3	56.05	87	58.20	108	52.47	78	72.36	131	38.153	129	24.52	97	54.20	40	74.69	124
ug. 8.3	55.18	92	59.28	57	51.69	88	73.67	82	38.024	149	25.49	70	53.80	44	75.93	75
18.3	54.26	96	59.85	6	50.81	95	74.49	30	37.875	166	26.19	44	53.36	45	76.68	24
28.3	53.30	96	59.91	47	49.86	97	74.79	24	37.709	175	26.63	16	52.91	45	76.92	27
pt. 7.2	52.34	95	59.44	98	48.89	96	74.55	79	37.534	175	26.79	13	52.46	46	76.65	80
17.2	51.39	92	58.46	147	47.93	89	73.76	131	37.359	166	26.66	42	52.00	44	75.85	131
27.2	50.47	85	56.99	195	47.04	80	72.45	180	37.193	150	26.24	71	51.56	39	74.54	179
ct. 7.1	49.62	77	55.04	239	46.24	66	70.65	222	37.043	122	25.53	100	51.17	36	72.75	225
17.1	48.85	67	52.65	278	45.58	49	68.43	257	36.921	87	24.53	130	50.81	31	70.50	267
27.1	48.18	52	49.87	312	45.09	30	65.86	282	36.834	46	23.23	158	50.50	23	67.83	304
ov. 6.1	47.66	38	46.75	338	44.79	6	63.04	297	36.788	2	21.65	182	50.27	15	64.79	332
16.0	47.28	22	43.37	358	44.73	15	60.07	300	36.790	51	19.83	205	50.12	7	61.47	356
26.0	47.06	5	39.79	366	44.88	38	57.07	292	36.841	101	17.78	221	50.05	4	57.91	367
c. 6.0	47.01	12	36.13	364	45.26	61	54.15	275	36.942	149	15.57	233	50.09	12	54.24	369
15.9	47.13	30	32.49	351	45.87	81	51.40	246	37.091	194	13.24	236	50.21	21	50.55	358
25.9	47.43	46	28.98	327	46.68	100	48.94	211	37.285	232	10.88	235	50.42	29	46.97	338
35.9	47.89		25.71		47.68		46.83		37.517		8.53		50.71		43.59	
Place	54.741		49.54		40.624		47.43		34.845		24.78		51.890		66.46	
, Tan δ	4.118		+3.994		5.110		−5.012		1.032		+0.253		2.109		+1.857	
, $D_\omega \alpha$	−0.03		+0.11		+0.18		−0.14		+0.05		+0.01		+0.02		+0.05	
, $D_\omega \delta$	−0.2		−0.9		−0.2		−0.9		−0.2		−0.9		−0.2		−0.9	

FOR THE UPPER TRANSIT AT .

39398°—1917——29

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ζ Herculis. Mag. 3.0				α Triang. Aust. Mag. 1.9				η Herculis. Mag. 3.6				Groombrid[ge] Mag.	
	Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.	
	h m 16 38		° ′ +31 44		h m 16 39		° ′ −68 52		h m 16 40		° ′ +39 4		h m 16 43	
	s		″		s		″		s		″		s	
Jan. 0.9	8.835	243	57.32	285	50.40	61	33.37	171	2.192	249	33.37	304	41.630	284
10.9	9.078	277	54.47	258	51.01	68	31.66	133	2.441	287	30.33	274	41.914	344
20.9	9.355	304	51.89	223	51.69	73	30.33	95	2.728	318	27.59	235	42.258	392
30.8	9.659	319	49.66	180	52.42	77	29.38	51	3.046	338	25.24	188	42.650	427
Feb. 9.8	9.978	328	47.86	129	53.19	79	28.87	9	3.384	348	23.36	133	43.077	451
19.8	10.306	329	46.57	74	53.98	79	28.78	31	3.732	351	22.03	74	43.528	458
Mar. 1.8	10.635	322	45.83	18	54.77	78	29.09	70	4.083	345	21.29	13	43.986	454
11.7	10.957	308	45.65	39	55.55	76	29.79	107	4.428	331	21.16	49	44.440	437
21.7	11.265	291	46.04	92	56.31	72	30.86	138	4.759	310	21.65	105	44.877	408
31.7	11.556	267	46.96	141	57.03	67	32.24	169	5.069	286	22.70	157	45.285	371
Apr. 10.6	11.823	241	48.37	184	57.70	61	33.93	194	5.355	255	24.27	202	45.656	326
20.6	12.064	209	50.21	218	58.31	54	35.87	217	5.610	220	26.29	238	45.982	272
30.6	12.273	175	52.39	244	58.85	48	38.04	233	5.830	182	28.67	267	46.254	215
May 10.6	12.448	142	54.83	262	59.33	39	40.37	246	6.012	143	31.34	283	46.469	152
20.5	12.590	102	57.45	269	59.72	30	42.83	252	6.155	100	34.17	293	46.621	87
30.5	12.692	62	60.14	270	60.02	21	45.35	254	6.255	56	37.10	292	46.708	22
June 9.5	12.754	23	62.84	261	60.23	9	47.89	248	6.311	12	40.02	283	46.730	43
19.5	12.777	18	65.45	248	60.32	0	50.37	237	6.323	34	42.85	266	46.687	106
29.4	12.759	59	67.93	226	60.32	10	52.74	219	6.289	77	45.51	244	46.581	166
July 9.4	12.700	95	70.19	199	60.22	19	54.93	195	6.212	118	47.95	213	46.415	223
19.4	12.605	132	72.18	168	60.03	28	56.88	163	6.094	156	50.08	180	46.192	274
29.3	12.473	163	73.86	134	59.75	36	58.51	126	5.938	189	51.88	142	45.918	317
Aug. 8.3	12.310	188	75.20	97	59.39	44	59.77	86	5.749	217	53.30	101	45.601	352
18.3	12.122	208	76.17	58	58.95	47	60.63	40	5.532	237	54.31	58	45.249	377
28.3	11.914	219	76.75	17	58.48	50	61.03	7	5.295	248	54.89	13	44.872	392
Sept. 7.2	11.695	222	76.92	25	57.98	50	60.96	55	5.047	252	55.02	32	44.480	395
17.2	11.473	214	76.67	66	57.48	49	60.41	103	4.795	245	54.70	78	44.085	385
27.2	11.259	199	76.01	107	56.99	43	59.38	146	4.550	227	53.92	122	43.700	361
Oct. 7.2	11.060	172	74.94	147	56.56	37	57.92	187	4.323	199	52.70	165	43.339	326
17.1	10.888	136	73.47	183	56.19	28	56.05	220	4.124	162	51.05	206	43.013	278
27.1	10.752	95	71.64	219	55.91	17	53.85	243	3.962	115	48.99	242	42.735	219
Nov. 6.1	10.657	43	69.45	249	55.74	6	51.42	260	3.847	63	46.57	274	42.516	149
16.0	10.614	10	66.96	275	55.68	8	48.82	265	3.784	7	43.83	301	42.367	74
26.0	10.624	64	64.21	292	55.76	20	46.17	260	3.777	54	40.82	318	42.293	6
Dec. 6.0	10.688	119	61.29	303	55.96	33	43.57	246	3.831	112	37.64	328	42.299	87
16.0	10.807	170	58.26	304	56.29	44	41.11	223	3.943	168	34.36	327	42.386	166
25.9	10.977	216	55.22	294	56.73	55	38.88	195	4.111	218	31.09	316	42.552	239
35.9	11.193		52.28		57.28		36.93		4.329		27.93		42.791	
Mean Place	9.418		68.88		51.756		37.47		2.984		45.77		43.346	
Sec δ, Tan δ	1.176		+0.619		2.775		−2.589		1.288		+0.812		1.833	
$D_\psi\alpha$, $D_\omega\alpha$	+0.05		+0.01		+0.13		−0.06		+0.04		+0.02		+0.02	
$D_\psi\delta$, $D_\omega\delta$	−0.1		−0.9		−0.1		−0.9		−0.1		−0.9		−0.1	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	30 Ophiuchi. Mag. 5.0 Right Ascension.		Declination.		ε Herculis. Mag. 3.9 Right Ascension.		Declination.		d Herculis. Mag. 5.3 Right Ascension.		Declination.		η Ophi[uchi] Mag. Right Ascension.	
	h m		° ′		h m		° ′		h m		° ′		h m	
	16 56		− 4 5		16 57		+31 2		16 58		+33 40		17 5	
	s		″		s		″		s		″		s	
Jan. 0.9	40.810		61.88		6.161		42.05		31.699		65.03		36.776	
10.9	41.047	237	63.29	141	6.387	226	39.19	286	31.925	226	62.09	294	37.020	244
20.9	41.313	266	64.67	138	6.649	262	36.56	263	32.188	263	59.40	269	37.293	273
30.8	41.598	285	65.97	130	6.938	289	34.24	232	32.481	293	57.03	237	37.588	295
Feb. 9.8	41.896	298	67.11	114	7.248	310	32.35	189	32.796	315	55.10	193	37.898	310
19.8	42.203	307	68.08	97	7.569	321	30.96	139	33.122	326	53.66	144	38.215	317
Mar. 1.8	42.509	306	68.81	73	7.895	326	30.08	88	33.453	331	52.78	88	38.534	319
11.7	42.810	301	69.29	48	8.218	323	29.77	31	33.783	330	52.48	30	38.850	316
21.7	43.104	294	69.49	20	8.531	313	30.03	26	34.104	321	52.76	28	39.160	310
31.7	43.385	281	69.43	6	8.830	299	30.83	80	34.408	304	53.59	83	39.457	297
Apr. 10.7	43.652	267	69.11	32	9.110	280	32.13	130	34.694	286	54.93	134	39.742	285
20.6	43.901	249	68.58	53	9.364	254	33.87	174	34.954	260	56.73	180	40.010	268
30.6	44.129	228	67.86	72	9.592	228	35.98	211	35.185	231	58.92	219	40.257	247
May 10.6	44.332	203	66.99	87	9.788	196	38.36	238	35.383	198	61.39	247	40.482	225
20.5	44.509	177	66.02	97	9.949	161	40.95	259	35.545	162	64.06	267	40.679	197
30.5	44.657	148	64.99	103	10.073	124	43.65	270	35.669	124	66.85	279	40.846	167
June 9.5	44.772	115	63.93	106	10.158	85	46.37	272	35.753	84	69.66	281	40.981	135
19.5	44.852	80	62.88	105	10.203	45	49.04	267	35.794	41	72.43	277	41.080	99
29.4	44.898	46	61.88	100	10.205	2	51.57	253	35.793	1	75.06	263	41.140	60
July 9.4	44.906	8	60.94	94	10.166	39	53.93	236	35.749	44	77.50	244	41.161	21
19.4	44.877	29	60.09	85	10.087	79	56.04	211	35.664	85	79.67	217	41.143	18
29.4	44.813	64	59.33	76	9.970	117	57.86	182	35.540	124	81.56	189	41.087	56
Aug. 8.3	44.717	96	58.69	64	9.819	151	59.34	148	35.382	158	83.10	154	40.995	92
18.3	44.593	124	58.15	54	9.640	179	60.47	113	35.195	187	84.26	116	40.874	121
28.3	44.447	146	57.72	43	9.438	202	61.21	74	34.983	212	85.02	76	40.729	145
Sept. 7.2	44.285	162	57.41	31	9.221	217	61.55	34	34.758	225	85.36	34	40.565	164
17.2	44.118	167	57.24	17	8.998	223	61.48	7	34.526	232	85.29	7	40.394	171
27.2	43.955	163	57.19	5	8.779	219	61.01	47	34.297	229	84.79	50	40.225	169
Oct. 7.2	43.803	152	57.28	9	8.575	204	60.12	89	34.083	214	83.86	93	40.069	156
17.1	43.674	129	57.53	25	8.393	182	58.82	130	33.891	192	82.51	135	39.934	135
27.1	43.576	98	57.93	40	8.244	149	57.13	169	33.733	158	80.76	175	39.831	103
Nov. 6.1	43.518	58	58.50	57	8.135	109	55.09	204	33.616	117	78.64	212	39.768	63
16.1	43.503	15	59.25	75	8.074	61	52.73	236	33.547	69	76.19	245	39.751	17
26.0	43.536	33	60.16	91	8.066	8	50.09	264	33.531	16	73.47	272	39.782	31
Dec. 6.0	43.619	83	61.24	108	8.112	46	47.25	284	33.570	39	70.54	293	39.865	83
16.0	43.749	130	62.47	123	8.211	99	44.28	297	33.665	95	67.48	306	39.997	132
25.9	43.923	174	63.79	132	8.361	150	41.27	301	33.813	148	64.39	309	40.176	179
35.9	44.137	214	65.17	138	8.558	197	38.33	294	34.009	196	61.37	302	40.395	219
Mean Place	40.999		56.57		6.805		52.31		32.416		75.49		36.950	
Sec δ, Tan δ	1.003		−0.072		1.167		+0.602		1.202		+0.667		1.039	
$D_\psi \alpha$, $D_\omega \alpha$	+0.06		0.00		+0.05		+0.01		+0.04		+0.01		+0.07	
$D_\psi \delta$, $D_\omega \delta$	−0.1		−1.0		−0.1		−1.0		−0.1		−1.0		−0.1	

FOR THE UPPER TRANSIT AT WASHINGTON.

	η Scorpii. Mag. 3.4				ζ Draconis. Mag. 3.2				α Herculis. Var. 3.1–3.9				δ Herculis. Mag. 3.2			
	Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.	
	h m 17 6		° ′ −43 7		h m 17 8		° ′ +65 48		h m 17 10		° ′ +14 28		h m 17 11		° ′ +24 55	
	s		″		s		″		s		″		s		″	
9	11.984	312	51.94	75	29.73	27	48.32	340	51.342	213	54.99	225	36.736	211	61.96	268
9	12.296	351	51.19	55	30.00	37	44.92	309	51.555	245	52.74	212	36.947	245	59.28	249
9	12.647	379	50.64	34	30.37	45	41.83	267	51.800	270	50.62	191	37.192	273	56.79	221
9	13.026	401	50.30	13	30.82	51	39.16	216	52.070	286	48.71	162	37.465	293	54.58	186
8	13.427	411	50.17	6	31.33	55	37.00	156	52.356	297	47.09	126	37.758	306	52.72	142
8	13.838	415	50.23	24	31.88	57	35.44	90	52.653	302	45.83	86	38.064	312	51.30	92
8	14.253	412	50.47	39	32.45	58	34.54	22	52.955	300	44.97	42	38.376	311	50.38	42
7	14.665	404	50.86	53	33.03	57	34.32	46	53.255	295	44.55	1	38.687	305	49.96	11
7	15.069	390	51.39	67	33.60	54	34.78	111	53.550	284	44.56	45	38.992	294	50.07	62
7	15.459	372	52.06	78	34.14	50	35.89	171	53.834	270	45.01	86	39.286	279	50.69	109
7	15.831	349	52.84	87	34.64	44	37.60	224	54.104	252	45.87	122	39.565	258	51.78	152
6	16.180	323	53.71	96	35.08	37	39.84	268	54.356	231	47.09	151	39.823	235	53.30	187
.6	16.503	291	54.67	105	35.45	30	42.52	302	54.587	205	48.60	176	40.058	208	55.17	216
.6	16.794	255	55.72	112	35.75	22	45.54	325	54.792	179	50.36	193	40.266	176	57.33	236
.6	17.049	215	56.84	116	35.97	13	48.79	339	54.971	147	52.29	204	40.442	142	59.69	248
.5	17.264	171	58.00	119	36.10	4	52.18	341	55.118	113	54.33	207	40.584	106	62.17	253
.5	17.435	124	59.19	120	36.14	5	55.59	335	55.231	77	56.40	205	40.690	66	64.70	249
.5	17.559	72	60.39	115	36.09	14	58.94	319	55.308	40	58.45	197	40.756	27	67.19	240
.4	17.631	22	61.54	111	35.95	21	62.13	294	55.348	2	60.42	184	40.783	14	69.59	224
.4	17.653	31	62.65	101	35.74	30	65.07	263	55.350	36	62.26	166	40.769	53	71.83	203
9.4	17.622	82	63.66	88	35.44	37	67.70	226	55.314	74	63.92	147	40.716	91	73.86	177
9.4	17.540	127	64.54	69	35.07	43	69.96	184	55.240	107	65.39	123	40.625	127	75.63	149
8.3	17.413	167	65.23	50	34.64	49	71.80	138	55.133	135	66.62	98	40.498	156	77.12	116
8.3	17.246	198	65.73	25	34.15	53	73.18	88	54.998	160	67.60	70	40.342	180	78.28	82
8.3	17.048	221	65.98	1	33.62	55	74.06	38	54.838	175	68.30	44	40.162	197	79.10	47
7.3	16.827	230	65.99	26	33.07	55	74.44	15	54.663	184	68.74	13	39.965	206	79.57	9
17.2	16.597	227	65.73	51	32.52	55	74.29	67	54.479	183	68.87	17	39.759	204	79.66	29
27.2	16.370	210	65.22	77	31.97	53	73.62	119	54.296	172	68.70	46	39.555	194	79.37	67
7.2	16.160	181	64.45	98	31.44	50	72.43	170	54.124	153	68.24	77	39.361	173	78.70	103
17.1	15.979	141	63.47	117	30.94	44	70.73	217	53.971	123	67.47	107	39.188	144	77.67	139
27.1	15.838	88	62.30	128	30.50	37	68.56	259	53.848	87	66.40	134	39.044	106	76.28	175
6.1	15.750	29	61.02	137	30.13	29	65.97	298	53.761	44	65.06	163	38.938	62	74.53	206
16.1	15.721	35	59.65	138	29.84	20	62.99	328	53.717	3	63.43	185	38.876	12	72.47	232
26.0	15.756	103	58.27	132	29.64	9	59.71	351	53.720	52	61.58	207	38.864	38	70.15	255
6.0	15.859	167	56.95	122	29.55	1	56.20	362	53.772	100	59.51	220	38.902	89	67.60	269
16.0	16.026	226	55.73	107	29.56	12	52.58	364	53.872	147	57.31	228	38.991	139	64.91	275
26.0	16.252	281	54.66	90	29.68	22	48.94	351	54.019	187	55.03	228	39.130	182	62.16	273
35.9	16.533		53.76		29.90		45.43		54.206		52.75		39.312		59.43	
lace	12.319		52.14		32.643		60.27		51.730		62.46		37.296		70.61	
an δ	1.370		−0.937		2.441		+2.227		1.033		+0.258		1.103		+0.465	
α	+0.09		−0.01		0.00		+0.03		+0.05		0.00		+0.05		+0.01	
δ	−0.1		−1.0		−0.1		−1.0		−0.1		−1.0		−0.1		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	π Herculis. Mag. 3.4 Right Ascension.		π Herculis. Declination.		θ Ophiuchi. Mag. 3.4 Right Ascension.		θ Ophiuchi. Declination.		ω Herculis. Mag. 5.4 Right Ascension.		ω Herculis. Declination.		β A… Mag. Right Ascension.	
	h m 17 12		° ′ +36 53		h m 17 16		° ′ −24 55		h m 17 17		° ′ +32 34		h m 17 18	
	s		″		s		″		s		″		s	
Jan. 0.9	8.457	211	57.33	304	54.416	250	6.40	17	32.412	206	16.26	295	23.168	363
10.9	8.668	254	54.29	282	54.666	281	6.57	27	32.618	245	13.31	275	23.531	417
20.9	8.922	286	51.47	247	54.947	307	6.84	34	32.863	275	10.56	244	23.948	459
30.9	9.208	313	49.00	205	55.254	323	7.18	38	33.138	301	8.12	204	24.407	489
Feb. 9.8	9.521	329	46.95	155	55.577	333	7.56	39	33.439	316	6.08	156	24.896	508
19.8	9.850	338	45.40	97	55.910	337	7.95	38	33.755	326	4.52	103	25.404	518
Mar. 1.8	10.188	338	44.43	38	56.247	337	8.33	34	34.081	327	3.49	45	25.922	519
11.8	10.526	333	44.05	21	56.584	331	8.67	30	34.408	322	3.04	11	26.441	513
21.7	10.859	320	44.26	79	56.915	322	8.97	23	34.730	310	3.15	67	26.954	498
31.7	11.179	300	45.05	134	57.237	308	9.20	18	35.040	294	3.82	119	27.452	476
Apr. 10.7	11.479	277	46.39	181	57.545	292	9.38	14	35.334	273	5.01	166	27.928	451
20.6	11.756	248	48.20	222	57.837	273	9.52	11	35.607	247	6.67	206	28.379	417
30.6	12.004	215	50.42	255	58.110	249	9.63	8	35.854	216	8.73	237	28.796	377
May 10.6	12.219	178	52.97	277	58.359	221	9.71	8	36.070	183	11.10	261	29.173	331
20.6	12.397	139	55.74	290	58.580	191	9.79	7	36.253	146	13.71	274	29.504	278
30.5	12.536	95	58.64	295	58.771	155	9.86	10	36.399	105	16.45	280	29.782	221
June 9.5	12.631	51	61.59	292	58.926	117	9.96	11	36.504	63	19.25	278	30.003	159
19.5	12.682	6	64.51	280	59.043	76	10.07	12	36.567	20	22.03	267	30.162	92
29.5	12.688	40	67.31	260	59.119	34	10.19	13	36.587	23	24.70	249	30.254	25
July 9.4	12.648	84	69.91	236	59.153	9	10.32	13	36.564	66	27.19	227	30.279	43
19.4	12.564	125	72.27	206	59.144	50	10.45	11	36.498	106	29.46	198	30.236	108
29.4	12.439	163	74.33	171	59.094	89	10.56	7	36.392	142	31.44	166	30.128	168
Aug. 8.3	12.276	194	76.04	132	59.005	124	10.63	2	36.250	176	33.10	129	29.960	221
18.3	12.082	221	77.36	93	58.881	151	10.65	4	36.074	201	34.39	92	29.739	263
28.3	11.861	238	78.29	49	58.730	172	10.61	11	35.873	220	35.31	51	29.476	292
Sept. 7.3	11.623	247	78.78	5	58.558	181	10.50	20	35.653	229	35.82	9	29.184	309
17.2	11.376	246	78.83	40	58.377	181	10.30	29	35.424	230	35.91	34	28.875	306
27.2	11.130	234	78.43	85	58.196	170	10.01	35	35.194	218	35.57	76	28.569	291
Oct. 7.2	10.896	212	77.58	128	58.026	149	9.66	40	34.976	199	34.81	118	28.278	255
17.2	10.684	180	76.30	171	57.877	116	9.26	43	34.777	168	33.63	159	28.023	206
27.1	10.504	140	74.59	211	57.761	75	8.83	43	34.609	130	32.04	196	27.817	143
Nov. 6.1	10.364	92	72.48	245	57.686	27	8.40	40	34.479	85	30.08	230	27.674	71
16.1	10.272	38	70.03	275	57.659	24	8.00	34	34.394	34	27.78	261	27.603	10
26.0	10.234	18	67.28	298	57.683	77	7.66	24	34.360	20	25.17	283	27.613	92
Dec. 6.0	10.252	74	64.30	313	57.760	130	7.42	14	34.380	75	22.34	299	27.705	174
16.0	10.326	130	61.17	318	57.890	179	7.28	2	34.455	127	19.35	305	27.879	250
26.0	10.456	181	57.99	312	58.069	222	7.26	9	34.582	174	16.30	302	28.129	319
35.9	10.637		54.87		58.291		7.35		34.756		13.28		28.448	
Mean Place	9.316		67.14		54.620		4.13		33.166		25.28		23.824	
Sec δ, Tan δ	1.250		+0.751		1.103		−0.465		1.187		+0.639		1.763	
$D_\psi \alpha$, $D_\omega \alpha$	+0.04		+0.01		+0.07		−0.01		+0.04		+0.01		+0.10	
$D_\psi \delta$, $D_\omega \delta$	−0.1		−1.0		−0.1		−1.0		−0.1		−1.0		−0.1	

FOR THE UPPER TRANSIT AT WASHINGTON.

FOR THE UPPER TRANSIT AT .

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FOR THE UPPER TRANSIT AT WASHINGTON.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	θ Herculis. Mag. 4.0 Right Ascension.		Declination.		ν Ophiuchi. Mag. 3.5 Right Ascension.		Declination.		ξ Herculis. Mag. 3.8 Right Ascension.		Declination.		γ Draconis. Mag. 2.4 Right Ascension.		Declination.	
	h m 17 53		° ′ +37 15		h m 17 54		° ′ − 9 45		h m 17 54		° ′ +29 15		h m 17 54		° +51	
	s		″		s		″		s		″		s		″	
Jan. 1.0	23.386		32.31		27.130		55.65		31.620		15.75		39.040		[illegible]	
10.9	23.551	165	29.24	307	27.322	192	56.53	88	31.786	166	12.95	280	39.204	164	[illegible]	
20.9	23.762	211	26.33	291	27.549	227	57.40	87	31.993	207	10.29	266	39.429	225	[illegible]	
30.9	24.013	251	23.70	263	27.802	253	58.23	83	32.234	241	7.86	243	39.708	279	[illegible]	
Feb. 9.9	24.294	281	21.43	227	28.075	273	58.96	73	32.504	270	5.78	208	40.032	324	[illegible]	
19.8	24.601	307	19.63	180	28.363	288	59.56	60	32.794	290	4.12	166	40.392	360	32.44	
Mar. 1.8	24.925	324	18.36	127	28.661	298	59.99	43	33.099	305	2.94	118	40.778	386	[illegible]	
11.8	25.259	334	17.67	69	28.964	303	60.22	23	33.413	314	2.29	65	41.179	401	30.27	
21.8	25.596	337	17.57	10	29.268	304	60.25	3	33.729	316	2.20	9	41.585	406	30.16	
31.7	25.929	333	18.08	51	29.570	302	60.06	19	34.042	313	2.65	45	41.986	401	30.71	
Apr. 10.7	26.251	322	19.15	107	29.865	295	59.68	38	34.344	302	3.63	98	42.373	387	31.87	
20.7	26.556	305	20.74	159	30.150	285	59.13	55	34.634	290	5.08	145	42.735	362	33.60	
30.6	26.840	284	22.79	205	30.422	272	58.42	71	34.905	271	6.95	187	43.068	333	35.84	
May 10.6	27.094	254	25.20	241	30.674	252	57.60	82	35.151	246	9.17	222	43.361	293	[illegible]	
20.6	27.316	222	27.92	272	30.905	231	56.71	89	35.367	216	11.67	250	43.608	247	41.48	
30.6	27.501	185	30.83	291	31.108	203	55.79	92	35.551	184	14.34	267	43.804	196	44.69	
June 9.5	27.643	142	33.87	304	31.281	173	54.86	93	35.698	147	17.11	277	43.944	140	48.05	
19.5	27.741	98	36.91	304	31.421	140	53.96	90	35.804	106	19.91	280	44.027	83	51.40	
29.5	27.792	51	39.91	300	31.521	100	53.11	85	35.868	64	22.65	274	44.050	23	54.71	
July 9.4	27.794	2	42.78	287	31.582	61	52.33	78	35.889	21	25.27	262	44.012	38	57.89	
19.4	27.749	45	45.43	265	31.601	19	51.65	68	35.864	25	27.70	243	43.914	98	60.85	
29.4	27.658	91	47.84	241	31.579	22	51.05	60	35.796	68	29.89	219	43.761	153	63.52	
Aug. 8.4	27.524	134	49.92	208	31.518	61	50.55	50	35.688	108	31.80	191	43.555	206	65.85	
18.3	27.351	173	51.65	173	31.422	96	50.13	42	35.544	144	33.38	158	43.303	252	67.79	
28.3	27.145	206	53.00	135	31.294	128	49.80	33	35.368	176	34.61	123	43.014	289	69.29	
Sept. 7.3	26.915	230	53.93	93	31.144	150	49.57	23	35.168	200	35.47	86	42.694	320	70.33	
17.3	26.669	246	54.42	49	30.977	167	49.40	17	34.952	216	35.94	47	42.355	339	70.88	
27.2	26.417	252	54.46	4	30.804	173	49.30	10	34.730	222	35.98	4	42.008	347	70.92	
Oct. 7.2	26.168	249	54.05	41	30.636	168	49.29	1	34.512	218	35.63	35	41.665	343	70.45	
17.2	25.933	235	53.18	87	30.481	155	49.36	7	34.308	204	34.88	75	41.340	325	69.47	
27.1	25.725	208	51.87	131	30.350	131	49.52	16	34.127	181	33.71	117	41.044	296	68.00	147
Nov. 6.1	25.551	174	50.13	174	30.251	99	49.79	27	33.979	148	32.16	155	40.787	257	66.05	195
16.1	25.419	132	47.99	214	30.192	59	50.15	36	33.871	108	30.26	190	40.581	206	63.68	237
26.1	25.336	83	45.51	248	30.177	15	50.63	48	33.809	62	28.02	224	40.434	147	60.91	277
Dec. 6.0	25.306	30	42.75	276	30.209	32	51.23	60	33.796	13	25.53	249	40.351	83	57.83	308
16.0	25.331	25	39.78	297	30.288	79	51.94	71	33.834	38	22.84	269	40.336	15	54.53	330
26.0	25.410	79	36.68	310	30.413	125	52.72	78	33.923	89	20.03	281	40.391	55	51.10	343
36.0	25.543	133	33.58	310	30.578	165	53.57	85	34.059	136	17.20	283	40.512	121	47.66	344
Mean Place	24.377		38.91		27.394		51.93		32.377		21.90		40.717		53.36	
Sec δ, Tan δ	1.257		+0.761		1.015		−0.172		1.146		+0.560		1.606		+1.257	
$D_\psi a$, $D_\omega a$	+0.04		0.00		+0.07		0.00		+0.05		0.00		+0.03		0.00	
$D_\psi \delta$, $D_\omega \delta$	0.0		−1.0		0.0		−1.0		0.0		−1.0		0.0		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

...ington ... Time.	67 Ophiuchi. Mag. 3.9 Right Ascension.		Declination.		θ Aræ. Mag. 3.9 Right Ascension.		Declination.	
	h m 17 56		° ′ + 2 55		h m 18 0		° ′ −50 5	
	s		″		s		″	
. 1.0	28.956	180	60.11	158	9.617	273	55.83	154
10.9	29.136	212	58.53	154	9.890	326	54.29	139
20.9	29.348	239	56.99	141	10.216	369	52.90	120
30.9	29.587	262	55.58	123	10.585	404	51.70	101
). 9.9	29.849	277	54.35	100	10.989	428	50.69	79
19.8	30.126	288	53.35	70	11.417	446	49.90	58
:. 1.8	30.414	293	52.65	38	11.863	456	49.32	38
11.8	30.707	295	52.27	6	12.319	460	48.94	15
21.8	31.002	293	52.21	29	12.779	456	48.79	6
31.7	31.295	287	52.50	61	13.235	446	48.85	26
:. 10.7	31.582	276	53.11	89	13.681	432	49.11	45
20.7	31.858	262	54.00	115	14.113	410	49.56	65
30.6	32.120	244	55.15	134	14.523	383	50.21	82
y 10.6	32.364	221	56.49	149	14.906	347	51.03	100
20.6	32.585	195	57.98	158	15.253	307	52.03	117
30.6	32.780	163	59.56	162	15.560	259	53.20	129
ıe 9.5	32.943	129	61.18	162	15.819	207	54.49	138
19.5	33.072	93	62.80	156	16.026	148	55.87	145
29.5	33.165	52	64.36	146	16.174	86	57.32	148
.y 9.5	33.217	13	65.82	135	16.260	24	58.80	145
19.4	33.230	28	67.17	119	16.284	38	60.25	138
29.4	33.202	67	68.36	104	16.246	99	61.63	125
ıg. 8.4	33.135	100	69.40	86	16.147	154	62.88	106
18.3	33.035	131	70.26	67	15.993	200	63.94	84
28.3	32.904	153	70.93	48	15.793	236	64.78	57
pt. 7.3	32.751	170	71.41	29	15.557	263	65.35	27
17.3	32.581	174	71.70	9	15.294	272	65.62	5
27.2	32.407	172	71.79	11	15.022	269	65.57	40
ct. 7.2	32.235	158	71.68	33	14.753	248	65.17	71
17.2	32.077	137	71.35	52	14.505	215	64.46	100
27.2	31.940	105	70.83	73	14.290	168	63.46	128
ov. 6.1	31.835	67	70.10	93	14.122	110	62.18	148
16.1	31.768	24	69.17	113	14.012	43	60.70	165
26.1	31.744	21	68.04	129	13.969	26	59.05	172
ec. 6.0	31.765	67	66.75	143	13.995	99	57.33	175
16.0	31.832	111	65.32	153	14.094	167	55.58	172
26.0	31.943	153	63.79	158	14.261	233	53.86	162
36.0	32.096		62.21		14.494		52.24	
...n Place	29.302		64.66		10.166		54.79	
δ, Tan δ	1.001		+0.051		1.559		−1.196	
a, D.. a	+0.06		0.00		+0.09		0.00	
δ, D.. δ	0.0		−1.0		0.0		−1.0	

...ington ... Time.	γ Sagittarii. Mag. 3.1 Right Ascension.		Declination.		70 Ophiuchi. Mag. 4.1 Right Ascension.		Declination.	
	h m 18 0		° ′ −30 25		h m 18 1		° ′ + 2 30	
	s		″		s		″	
. 1.0	28.202	216	36.85	40	15.211	176	59.50	157
10.9	28.418	255	36.45	32	15.387	209	57.93	153
20.9	28.673	286	36.13	23	15.596	237	56.40	141
30.9	28.959	310	35.90	19	15.833	259	54.99	123
). 9.9	29.269	328	35.71	14	16.092	275	53.76	101
19.8	29.597	340	35.57	11	16.367	287	52.75	72
:. 1.8	29.937	346	35.46	10	16.654	293	52.03	41
11.8	30.283	349	35.36	8	16.947	296	51.62	7
21.8	30.632	347	35.28	7	17.243	294	51.55	26
31.7	30.979	341	35.21	6	17.537	288	51.81	57
:. 10.7	31.320	331	35.15	5	17.825	279	52.38	85
20.7	31.651	314	35.10	1	18.104	264	53.23	111
30.6	31.965	296	35.09	3	18.368	247	54.34	130
y 10.6	32.261	272	35.12	9	18.615	226	55.64	146
20.6	32.533	241	35.21	15	18.841	198	57.10	154
30.6	32.774	207	35.36	24	19.039	168	58.64	158
ıe 9.5	32.981	167	35.60	29	19.207	135	60.22	158
19.5	33.148	124	35.89	35	19.342	98	61.80	153
29.5	33.272	78	36.24	39	19.440	57	63.33	143
.y 9.5	33.350	31	36.63	43	19.497	17	64.76	132
19.4	33.381	17	37.06	44	19.514	23	66.08	116
29.4	33.364	63	37.50	41	19.491	62	67.24	100
ıg. 8.4	33.301	104	37.91	37	19.429	95	68.24	83
18.3	33.197	140	38.28	29	19.334	128	69.07	64
28.3	33.057	170	38.57	18	19.206	150	69.71	46
pt. 7.3	32.887	187	38.75	6	19.056	168	70.17	26
17.3	32.700	197	38.81	6	18.888	175	70.43	7
27.2	32.503	193	38.75	21	18.713	172	70.50	14
ct. 7.2	32.310	177	38.54	33	18.541	158	70.36	33
17.2	32.133	151	38.21	44	18.383	138	70.03	53
27.2	31.982	115	37.77	54	18.245	107	69.50	74
ov. 6.1	31.867	70	37.23	59	18.138	70	68.76	93
16.1	31.797	21	36.64	63	18.068	28	67.83	112
26.1	31.776	33	36.01	62	18.040	17	66.71	128
ec. 6.0	31.809	86	35.39	58	18.057	63	65.43	142
16.0	31.895	139	34.81	53	18.120	107	64.01	152
26.0	32.034	185	34.28	46	18.227	151	62.49	156
36.0	32.219		33.82		18.378		60.93	
...n Place	28.482		34.56		15.559		63.87	
δ, Tan δ	1.160		−0.587		1.001		+0.044	
a, D.. a	+0.08		0.00		+0.06		0.00	
δ, D.. δ	0.0		−1.0		0.0		−1.0	

FOR THE UPPER TRANSIT AT .

FOR THE UPPER TRANSIT AT WASHINGTON.

on se.	Groombridge 2533. Mag. 5.4				36 Draconis. Mag. 5.0				δ Sagittarii. Mag. 2.8				η Serpentis. Mag. 3.4			
	Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.	
	h m 18 13		° ′ +42 7		h m 18 13		° ′ +64 21		h m 18 15		° ′ −29 51		h m 18 17		° ′ − 2 55	
	s		″		s		″		s		″		s		″	
.0	2.637	141	44.46	319	22.11	13	63.20	350	40.538	201	54.89	45	0.529	164	20.11	121
.0	2.778	191	41.27	305	22.24	23	59.70	336	40.739	237	54.44	38	0.693	199	21.32	117
.9	2.969	236	38.22	281	22.47	31	56.34	309	40.976	271	54.06	34	0.892	226	22.49	110
.9	3.205	274	35.41	244	22.78	39	53.25	271	41.247	298	53.72	28	1.118	250	23.59	96
.9	3.479	305	32.97	200	23.17	45	50.54	221	41.545	316	53.44	26	1.368	268	24.55	77
.8	3.784	328	30.97	147	23.62	50	48.33	164	41.861	331	53.18	24	1.636	282	25.32	54
.8	4.112	345	29.50	87	24.12	53	46.69	100	42.192	341	52.94	22	1.918	290	25.86	27
.8	4.457	354	28.63	26	24.65	55	45.69	34	42.533	345	52.72	23	2.208	295	26.13	1
..8	4.811	352	28.37	35	25.20	55	45.35	33	42.878	346	52.49	22	2.503	295	26.14	28
..7	5.163	345	28.72	95	25.75	54	45.68	100	43.224	342	52.27	20	2.798	293	25.86	54
).7	5.508	332	29.67	150	26.29	50	46.68	159	43.566	334	52.07	20	3.091	286	25.32	79
).7	5.840	310	31.17	201	26.79	46	48.27	214	43.900	322	51.87	17	3.377	275	24.53	99
).7	6.150	282	33.18	243	27.25	41	50.41	261	44.222	303	51.70	11	3.652	259	23.54	116
).6	6.432	248	35.61	275	27.66	33	53.02	299	44.525	282	51.59	5	3.911	240	22.38	127
0.6	6.680	209	38.36	301	27.99	26	56.01	325	44.807	254	51.54	3	4.151	214	21.11	133
0.6	6.889	164	41.37	316	28.25	19	59.26	343	45.061	219	51.57	10	4.365	186	19.78	136
9.5	7.053	117	44.53	322	28.44	10	62.69	352	45.280	182	51.67	18	4.551	151	18.42	135
9.5	7.170	67	47.75	319	28.54	2	66.21	349	45.462	141	51.85	28	4.702	115	17.07	128
:9.5	7.237	14	50.94	309	28.56	7	69.70	340	45.603	92	52.13	33	4.817	74	15.79	119
9.5	7.251	37	54.03	291	28.49	16	73.10	320	45.695	45	52.46	39	4.891	33	14.60	109
19.4	7.214	88	56.94	266	28.33	25	76.30	295	45.740	2	52.85	41	4.924	8	13.51	97
29.4	7.126	135	59.60	237	28.08	31	79.25	262	45.738	48	53.26	41	4.916	48	12.54	82
8.4	6.991	179	61.97	200	27.77	38	81.87	224	45.690	93	53.67	39	4.868	86	11.72	67
18.4	6.812	217	63.97	161	27.39	44	84.11	180	45.597	130	54.06	34	4.782	119	11.05	53
28.3	6.595	245	65.58	119	26.95	48	85.91	134	45.467	162	54.40	24	4.663	144	10.52	38
7.3	6.350	267	66.77	74	26.47	51	87.25	84	45.305	182	54.64	15	4.519	164	10.14	23
17.3	6.083	276	67.51	26	25.96	53	88.09	33	45.123	194	54.79	2	4.355	173	9.91	9
27.2	5.807	277	67.77	21	25.43	53	88.42	21	44.929	193	54.81	11	4.182	173	9.82	5
7.2	5.530	264	67.56	69	24.90	51	88.21	75	44.736	182	54.70	25	4.009	162	9.87	20
17.2	5.266	243	66.87	117	24.39	48	87.46	127	44.554	158	54.45	35	3.847	143	10.07	36
27.2	5.023	210	65.70	163	23.91	44	86.19	178	44.396	125	54.10	46	3.704	115	10.43	50
6.1	4.813	169	64.07	206	23.47	37	84.41	225	44.271	82	53.64	53	3.589	79	10.93	65
16.1	4.644	121	62.01	243	23.10	30	82.16	268	44.189	36	53.11	57	3.510	38	11.58	80
26.1	4.523	66	59.58	275	22.80	22	79.48	304	44.153	16	52.54	60	3.472	7	12.38	93
6.1	4.457	10	56.83	301	22.58	11	76.44	330	44.169	70	51.94	58	3.479	51	13.31	106
16.0	4.447	49	53.82	316	22.47	2	73.14	349	44.239	121	51.36	54	3.530	95	14.37	116
26.0	4.496	105	50.66	321	22.45	7	69.65	353	44.360	168	50.82	49	3.625	137	15.53	119
36.0	4.601		47.45		22.52		66.12		44.528		50.33		3.762		16.72	
'lace	3.849		49.53		25.151		68.30		40.823		52.34		0.847		16.45	
Tan δ	1.348		+0.905		2.312		+2.084		1.153		−0.574		1.001		−0.051	
)ₘ α	+0.04		0.00		+0.01		−0.01		+0.08		0.00		+0.06		0.00	
)ₘ δ	0.0		−1.0		0.0		−1.0		0.0		−1.0		0.0		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ε Sagittarii. Mag. 2.0 Right Ascension.		ε Sagittarii. Declination.		109 Herculis. Mag. 3.9 Right Ascension.		109 Herculis. Declination.		α Telescopii. Mag. 3.8 Right Ascension.		α Telescopii. Declination.		χ Draco[nis] Mag. 3 Right Ascension.	
	h m 18 18		° ′ −34 25		h m 18 20		° ′ +21 43		h m 18 20		° ′ −46 0		h m 18 22	
	s		″		s		″		s		″		s	
Jan. 1.0	39.439	204	31.95	72	9.015	143	47.38	248	48.699	229	57.68	144	28.34	11
11.0	39.643	246	31.23	67	9.158	183	44.90	238	48.928	279	56.24	133	28.45	25
20.9	39.889	280	30.56	59	9.341	216	42.52	219	49.207	322	54.91	119	28.70	38
30.9	40.169	308	29.97	52	9.557	244	40.33	193	49.529	357	53.72	106	29.08	49
Feb. 9.9	40.477	329	29.45	45	9.801	267	38.40	157	49.886	382	52.66	90	29.57	60
19.9	40.806	346	29.00	39	10.068	283	36.83	115	50.268	403	51.76	73	30.17	68
Mar. 1.8	41.152	356	28.61	35	10.351	295	35.68	69	50.671	416	51.03	58	30.85	73
11.8	41.508	361	28.26	29	10.646	302	34.99	19	51.087	423	50.45	40	31.58	77
21.8	41.869	363	27.97	23	10.948	303	34.80	31	51.510	425	50.05	23	32.35	77
31.7	42.232	359	27.74	18	11.251	300	35.11	78	51.935	421	49.82	8	33.12	75
Apr. 10.7	42.591	351	27.56	12	11.551	292	35.89	123	52.356	412	49.74	11	33.87	71
20.7	42.942	339	27.44	4	11.843	279	37.12	163	52.768	395	49.85	29	34.58	65
30.7	43.281	321	27.40	4	12.122	259	38.75	194	53.163	375	50.14	45	35.23	56
May 10.6	43.602	297	27.44	14	12.381	236	40.69	224	53.538	346	50.59	64	35.79	47
20.6	43.899	267	27.58	25	12.617	208	42.93	240	53.884	310	51.23	80	36.26	36
30.6	44.166	232	27.83	34	12.825	175	45.33	251	54.194	269	52.03	94	36.62	24
June 9.6	44.398	193	28.17	44	13.000	138	47.84	257	54.463	222	52.97	107	36.86	11
19.5	44.591	148	28.61	53	13.138	98	50.41	252	54.685	168	54.04	119	36.97	1
29.5	44.739	99	29.14	60	13.236	56	52.93	243	54.853	111	55.23	124	36.96	13
July 9.5	44.838	50	29.74	64	13.292	12	55.36	229	54.964	52	56.47	126	36.83	25
19.4	44.888	1	30.38	66	13.304	31	57.65	207	55.016	8	57.73	125	36.58	39
29.4	44.887	51	31.04	64	13.273	73	59.72	185	55.008	66	58.98	116	36.19	48
Aug. 8.4	44.836	97	31.68	58	13.200	111	61.57	156	54.942	119	60.14	104	35.71	57
18.4	44.739	137	32.26	50	13.089	143	63.13	125	54.823	168	61.18	88	35.14	66
28.3	44.602	170	32.76	38	12.946	172	64.38	95	54.655	206	62.06	66	34.48	72
Sept. 7.3	44.432	193	33.14	22	12.774	189	65.33	60	54.449	233	62.72	41	33.76	76
17.3	44.239	204	33.36	6	12.585	199	65.93	24	54.216	249	63.13	13	33.00	80
27.3	44.035	205	33.42	11	12.386	201	66.17	11	53.967	249	63.26	16	32.20	80
Oct. 7.2	43.830	193	33.31	30	12.185	191	66.06	47	53.718	237	63.10	45	31.40	78
17.2	43.637	169	33.01	46	11.994	171	65.59	84	53.481	208	62.65	74	30.62	75
27.2	43.468	135	32.55	60	11.823	145	64.75	118	53.273	169	61.91	99	29.87	69
Nov. 6.1	43.333	91	31.95	73	11.678	109	63.57	152	53.104	119	60.92	121	29.18	61
16.1	43.242	41	31.22	80	11.569	68	62.05	181	52.985	62	59.71	136	28.57	50
26.1	43.201	13	30.42	84	11.501	23	60.24	208	52.923	3	58.35	147	28.07	38
Dec. 6.1	43.214	67	29.58	85	11.478	24	58.16	227	52.926	67	56.88	153	27.69	27
16.0	43.281	121	28.73	83	11.502	70	55.89	242	52.993	130	55.35	154	27.42	13
26.0	43.402	172	27.90	79	11.572	116	53.47	247	53.123	192	53.81	148	27.29	3
36.0	43.574		27.11		11.688		51.00		53.315		52.33		27.32	
Mean Place	39.755		29.56		9.641		51.57		49.165		55.68		33.352	
Sec δ, Tan δ	1.212		−0.685		1.076		+0.399		1.440		−1.036		3.362	
$D_\psi \alpha$, $D_\omega \alpha$	+0.08		0.00		+0.05		0.00		+0.09		+0.01		−0.02	
$D_\psi \delta$, $D_\omega \delta$	0.0		−1.0		0.0		−1.0		0.0		−1.0		0.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

...ington ...s Time.	λ Sagittarii. Mag. 2.9 Right Ascension.		Declination.		c Serpentis. Mag. 5.4 Right Ascension.		Declination.		1 Aquilæ. Mag. 4.1 Right Ascension.		Declination.		ζ Pavonis. Mag. 4.1 Right Ascension.		Declination.	
	h m 18 22		° ′ −25 28		h m 18 25		° ′ − 2 2		h m 18 30		° ′ − 8 18		h m 18 33		° ′ −71 29	
	s		″		s		″		s		″		s		″	
1.0	50.642	184	10.44	20	21.467	156	27.25	121	41.128	157	14.28	82	18.54	37	65.91	277
11.0	50.826	223	10.24	16	21.623	192	28.46	119	41.285	191	15.10	81	18.91	48	63.14	263
20.9	51.049	254	10.08	14	21.815	220	29.65	109	41.476	222	15.91	76	19.39	59	60.51	242
30.9	51.303	278	9.94	13	22.035	246	30.74	96	41.698	246	16.67	65	19.98	68	58.09	215
b. 9.9	51.581	302	9.81	14	22.281	263	31.70	76	41.944	267	17.32	51	20.66	74	55.94	185
19.9	51.883	315	9.67	17	22.544	278	32.46	52	42.211	281	17.83	32	21.40	80	54.09	150
r. 1.8	52.198	325	9.50	20	22.822	288	32.98	27	42.492	291	18.15	12	22.20	84	52.59	113
11.8	52.523	331	9.30	25	23.110	293	33.25	3	42.783	298	18.27	11	23.04	87	51.46	76
21.8	52.854	332	9.05	29	23.403	297	33.22	31	43.081	301	18.16	33	23.91	87	50.70	37
31.7	53.186	330	8.76	33	23.700	295	32.91	61	43.382	300	17.83	54	24.78	86	50.33	0
r. 10.7	53.516	324	8.43	35	23.995	290	32.30	83	43.682	296	17.29	74	25.64	85	50.33	40
20.7	53.840	313	8.08	35	24.285	279	31.47	107	43.978	287	16.55	89	26.49	82	50.73	77
30.7	54.153	296	7.73	33	24.564	264	30.40	122	44.265	273	15.66	101	27.31	76	51.50	113
y 10.6	54.449	276	7.40	30	24.828	245	29.18	135	44.538	254	14.65	110	28.07	70	52.63	145
20.6	54.725	250	7.10	24	25.073	220	27.83	143	44.792	231	13.55	114	28.77	61	54.08	175
30.6	54.975	218	6.86	18	25.293	192	26.40	145	45.023	202	12.41	113	29.38	52	55.83	200
ne 9.6	55.193	182	6.68	9	25.485	160	24.95	144	45.225	169	11.28	111	29.90	42	57.83	221
19.5	55.375	143	6.59	1	25.645	122	23.51	139	45.394	132	10.17	104	30.32	31	60.04	235
29.5	55.518	99	6.58	8	25.767	83	22.12	126	45.526	93	9.13	95	30.63	18	62.39	243
ly 9.5	55.617	51	6.66	13	25.850	41	20.86	119	45.619	50	8.18	85	30.81	6	64.82	243
19.4	55.668	4	6.79	19	25.891	1	19.67	105	45.669	7	7.33	72	30.87	6	67.25	237
29.4	55.672	40	6.98	22	25.890	43	18.62	89	45.676	35	6.61	60	30.81	19	69.62	220
g. 8.4	55.632	83	7.20	23	25.847	79	17.73	75	45.641	74	6.01	49	30.62	32	71.82	198
18.4	55.549	121	7.43	22	25.768	114	16.98	58	45.567	109	5.52	37	30.30	40	73.80	167
28.3	55.428	151	7.65	17	25.654	141	16.40	44	45.458	136	5.15	25	29.90	49	75.47	129
pt. 7.3	55.277	175	7.82	12	25.513	160	15.96	27	45.322	159	4.90	16	29.41	55	76.76	85
17.3	55.102	185	7.94	5	25.353	170	15.69	13	45.163	170	4.74	6	28.86	59	77.61	38
27.3	54.917	186	7.99	4	25.183	173	15.56	4	44.993	172	4.68	3	28.27	61	77.99	12
t. 7.2	54.731	176	7.95	13	25.010	163	15.60	18	44.821	163	4.71	11	27.66	58	77.87	64
17.2	54.555	154	7.82	22	24.847	146	15.78	34	44.658	147	4.82	22	27.08	54	77.23	114
27.2	54.401	124	7.60	27	24.701	118	16.12	51	44.511	119	5.04	31	26.54	47	76.09	161
ov. 6.1	54.277	85	7.33	32	24.583	84	16.63	65	44.392	85	5.35	41	26.07	37	74.48	201
16.1	54.192	40	7.01	34	24.499	42	17.28	81	44.307	46	5.76	51	25.70	24	72.47	234
26.1	54.152	10	6.67	33	24.457	0	18.09	94	44.261	1	6.27	61	25.46	13	70.13	262
ec. 6.1	54.162	60	6.34	32	24.457	43	19.03	107	44.260	43	6.88	71	25.33	1	67.51	277
16.0	54.222	109	6.02	28	24.500	88	20.10	115	44.303	87	7.59	77	25.34	14	64.74	285
26.0	54.331	155	5.74	23	24.588	129	21.25	121	44.390	130	8.36	81	25.48	29	61.89	283
36.0	54.486		5.51		24.717		22.46		44.520		9.17		25.77		59.06	
...n Place	50.911		7.64		21.795		23.78		41.420		11.05		20.434		64.20	
δ, Tan δ	1.108		−0.476		1.001		−0.036		1.011		−0.146		3.152		−2.989	
..., $D_{\omega}\alpha$	+0.07		0.00		+0.06		0.00		+0.06		0.00		+0.14		+0.03	
..., $D_{\omega}\delta$	0.0		−1.0		0.0		−1.0		+0.1		−1.0		+0.1		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	α Lyræ. (Vega.) Mag. 0.1				2 Aquilæ. Mag. 4.7				φ Sagittarii. Mag. 3.3				110 Her Mag. 4	
	Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.	
	h m 18 34		° ′ +38 42		h m 18 37		° ′ − 9 7		h m 18 40		° ′ −27 4		h m 18 42	
	s		″		s		″		s		″		s	
Jan. 1.0	6.597		17.40		43.529		61.76		27.989		40.73		4.710	
11.0	6.713	116	14.34	306	43.680	151	62.51	75	28.157	168	40.34	39	4.832	122
20.9	6.879	166	11.36	298	43.865	185	63.24	73	28.365	208	39.98	36	4.993	161
30.9	7.088	209	8.59	277	44.082	217	63.90	66	28.605	240	39.64	34	5.187	194
Feb. 9.9	7.336	248	6.14	245	44.323	241	64.48	58	28.875	270	39.30	34	5.413	226
19.9	7.616	280	4.09	205	44.586	263	64.92	44	29.166	291	38.96	34	5.664	251
Mar. 1.8	7.922	306	2.54	155	44.864	278	65.17	25	29.476	310	38.60	36	5.933	269
11.8	8.246	324	1.54	100	45.154	290	65.23	6	29.798	322	38.22	38	6.218	285
21.8	8.582	336	1.14	40	45.451	297	65.07	16	30.130	332	37.80	42	6.514	296
31.8	8.924	342	1.34	20	45.753	302	64.71	36	30.466	336	37.35	45	6.815	301
Apr. 10.7	9.263	339	2.13	79	46.055	302	64.14	57	30.802	336	36.89	46	7.116	301
20.7	9.594	331	3.47	134	46.353	298	63.38	76	31.135	333	36.42	47	7.413	297
30.7	9.909	315	5.31	184	46.644	291	62.47	91	31.461	326	35.97	45	7.701	288
May 10.6	10.201	292	7.59	228	46.922	278	61.45	102	31.771	310	35.56	41	7.974	273
20.6	10.464	263	10.22	263	47.181	259	60.35	110	32.063	292	35.20	36	8.225	251
30.6	10.693	229	13.11	289	47.418	237	59.22	113	32.331	268	34.92	28	8.452	227
June 9.6	10.883	190	16.19	308	47.627	209	58.09	113	32.569	238	34.74	18	8.646	194
19.5	11.027	144	19.35	316	47.804	177	56.99	110	32.770	201	34.65	9	8.805	159
29.5	11.124	97	22.52	317	47.943	139	55.97	102	32.931	161	34.67	2	8.925	120
July 9.5	11.170	46	25.61	309	48.043	100	55.04	93	33.047	116	34.78	11	9.003	78
19.5	11.166	4	28.55	294	48.100	57	54.22	82	33.116	69	34.99	21	9.037	34
29.4	11.112	54	31.29	274	48.114	14	53.52	70	33.138	22	35.26	27	9.027	10
Aug. 8.4	11.010	102	33.75	246	48.085	29	52.93	59	33.112	26	35.57	31	8.974	53
18.4	10.863	147	35.88	213	48.016	69	52.47	46	33.041	71	35.91	34	8.882	92
28.3	10.679	184	37.66	178	47.911	105	52.12	35	32.930	111	36.24	33	8.753	129
Sept. 7.3	10.461	218	39.03	137	47.778	133	51.88	24	32.786	144	36.52	28	8.595	158
17.3	10.221	240	39.98	95	47.623	155	51.73	15	32.615	171	36.74	22	8.415	180
27.3	9.967	254	40.48	50	47.453	170	51.67	6	32.430	185	36.88	14	8.221	194
Oct. 7.2	9.709	258	40.52	4	47.281	172	51.70	3	32.241	189	36.92	4	8.023	198
17.2	9.458	251	40.09	43	47.116	165	51.80	10	32.059	182	36.85	7	7.831	192
27.2	9.225	233	39.20	89	46.967	149	51.99	19	31.895	164	36.68	17	7.654	177
Nov. 6.2	9.020	205	37.85	135	46.845	122	52.27	28	31.758	137	36.41	27	7.501	153
16.1	8.851	169	36.06	179	46.755	90	52.64	37	31.659	99	36.07	34	7.381	120
26.1	8.725	126	33.88	218	46.705	50	53.10	46	31.604	55	35.68	39	7.299	82
Dec. 6.1	8.649	76	31.37	251	46.698	7	53.64	54	31.596	8	35.26	42	7.259	40
16.0	8.625	24	28.59	278	46.735	37	54.26	62	31.638	42	34.83	43	7.263	4
26.0	8.654	29	25.62	297	46.816	81	54.96	70	31.729	91	34.40	43	7.313	50
36.0	8.737	83	22.56	306	46.940	124	55.70	74	31.866	137	34.00	40	7.405	92
Mean Place	7.695		20.61		43.817		58.66		28.264		37.80		5.321	
Sec δ, Tan δ	1.281		+0.801		1.013		−0.161		1.123		−0.511		1.067	
$D_\psi \alpha$, $D_\omega \alpha$	+0.04		−0.01		+0.07		0.00		+0.07		+0.01		+0.05	
$D_\psi \delta$, $D_\omega \delta$	+0.1		−1.0		+0.1		−1.0		+0.1		−1.0		+0.1	

FOR THE UPPER TRANSIT AT WASHINGTON.

ngton Time.	6 Aquilæ. Mag. 4.5				λ Pavonis. Mag. 4.4				β Lyræ. Var. 3.4–4.1				50 Draconis. Mag. 5.4			
	Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	18 42		− 4 50		18 44		−62 16		18 47		+33 15		18 48		+75 19	
	s		″		s		″		s		″		s		″	
1.0	45.920		18.58		30.77		65.56		0.001		53.87		57.44		70.27	
11.0	46.062	142	19.56	98	31.02	25	63.13	243	0.107	106	51.01	286	57.44	0	66.83	344
21.0	46.239	177	20.53	97	31.36	34	60.81	232	0.258	151	48.20	281	57.61	17	63.42	341
30.9	46.447	208	21.42	89	31.76	40	58.65	216	0.449	191	45.58	262	57.95	34	60.19	323
b. 9.9	46.680	233	22.18	76	32.22	46	56.68	197	0.677	228	43.23	235	58.43	48	57.26	293
19.9	46.935	255	22.78	60	32.73	51	54.96	172	0.936	259	41.26	197	59.04	61	54.73	253
r. 1.8	47.206	271	23.17	39	33.29	56	53.49	147	1.220	284	39.74	152	59.76	72	52.70	203
11.8	47.490	284	23.31	14	33.87	58	52.32	117	1.524	304	38.73	101	60.56	80	51.26	144
21.8	47.782	292	23.21	10	34.47	60	51.44	88	1.840	316	38.29	44	61.43	87	50.45	81
31.8	48.079	297	22.84	37	35.08	61	50.89	55	2.163	323	38.42	13	62.32	89	50.30	15
r. 10.7	48.377	298	22.22	62	35.69	61	50.65	24	2.488	325	39.10	68	63.21	89	50.82	52
20.7	48.673	296	21.38	84	36.29	60	50.73	8	2.808	320	40.32	122	64.05	84	51.96	114
30.7	48.961	288	20.35	103	36.87	58	51.13	40	3.115	307	42.02	170	64.85	80	53.69	173
y 10.7	49.237	276	19.16	119	37.42	55	51.85	72	3.406	291	44.15	213	65.56	71	55.93	224
20.6	49.495	258	17.87	129	37.93	51	52.85	100	3.671	265	46.62	247	66.16	60	58.62	269
30.6	49.731	236	16.52	135	38.39	46	54.15	130	3.908	237	49.34	272	66.65	49	61.67	305
ne 9.6	49.940	209	15.16	136	38.80	41	55.69	154	4.108	200	52.25	291	67.00	35	64.97	330
19.5	50.116	176	13.81	135	39.14	34	57.43	174	4.268	160	55.26	301	67.21	21	68.43	346
29.5	50.257	141	12.53	128	39.39	25	59.33	190	4.384	116	58.29	303	67.28	7	71.97	354
ly 9.5	50.357	100	11.35	118	39.57	18	61.34	201	4.453	69	61.25	296	67.18	10	75.48	351
19.5	50.415	58	10.27	108	39.65	8	63.39	205	4.474	21	64.09	284	66.95	23	78.89	341
29.4	50.431	16	9.33	94	39.65	0	65.43	204	4.446	28	66.73	264	66.58	37	82.12	323
g. 8.4	50.405	26	8.53	80	39.56	9	67.37	194	4.372	74	69.13	240	66.08	50	85.09	297
18.4	50.338	67	7.88	65	39.39	17	69.14	177	4.254	118	71.22	209	65.45	63	87.75	266
28.4	50.236	102	7.36	52	39.15	24	70.67	153	4.097	157	72.98	176	64.72	73	90.03	228
pt. 7.3	50.104	132	6.99	37	38.85	30	71.89	122	3.909	188	74.37	139	63.90	82	91.90	187
17.3	49.951	153	6.76	23	38.49	36	72.76	87	3.695	214	75.36	99	63.02	88	93.31	141
27.3	49.783	168	6.66	10	38.10	39	73.24	48	3.467	228	75.94	58	62.10	92	94.21	90
t. 7.2	49.610	173	6.68	2	37.70	40	73.27	3	3.233	234	76.08	14	61.15	95	94.60	39
17.2	49.445	165	6.82	14	37.32	38	72.86	41	3.004	229	75.79	29	60.20	95	94.46	14
27.2	49.294	151	7.10	28	36.97	35	72.01	85	2.790	214	75.06	73	59.29	91	93.78	68
ov. 6.2	49.169	125	7.50	40	36.66	31	70.74	127	2.600	190	73.89	117	58.43	86	92.57	121
16.1	49.075	94	8.02	52	36.41	25	69.11	163	2.443	157	72.32	157	57.64	79	90.84	173
26.1	49.020	55	8.66	64	36.24	17	67.17	194	2.326	117	70.36	196	56.95	69	88.63	221
ec. 6.1	49.006	14	9.42	76	36.16	8	64.98	219	2.253	73	68.08	228	56.40	55	85.99	264
16.1	49.036	30	10.28	86	36.17	1	62.63	235	2.229	24	65.52	256	55.98	42	82.99	300
26.0	49.110	74	11.21	93	36.28	11	60.19	244	2.254	25	62.78	274	55.71	27	79.74	325
36.0	49.224	114	12.17	96	36.48	20	57.73	246	2.328	74	59.93	285	55.62	9	76.33	341
n Place	46.231		15.57		31.787		63.04		0.919		56.11		63.584		71.11	
δ, Tan δ	1.004		−0.085		2.150		−1.903		1.196		+0.656		3.950		+3.821	
α, $D_\psi \alpha$	+0.06		0.00		+0.11		+0.02		+0.04		−0.01		−0.04		−0.05	
δ, $D_\psi \delta$	+0.1		*−1.0*		*+0.1*		−1.0		+0.1		−1.0		+0.1		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	*o* Draconis. Mag. 4.8 Right Ascension.		Declination.		*σ* Sagittarii. Mag. 2.1 Right Ascension.		Declination.		*θ* Serpentis *pr.* Mag. 4.5 Right Ascension.		Declination.		R Lyrae Var. 4.0 Right Ascension.	
	h m		° ′		h m		° ′		h m		° ′		h m	
	18 49		+59 16		18 50		−26 23		18 52		+ 4 5		18 52	
	s		″		s		′ ″		s		″		s	
Jan. 1.0	56.294	67	70.53	345	6.845	156	66.68	37	5.201	126	38.14	148	47.268	88
11.0	56.361	147	67.08	339	7.001	196	66.31	37	5.327	161	36.66	145	47.356	141
21.0	56.508	221	63.69	321	7.197	229	65.94	35	5.488	192	35.21	134	47.497	191
30.9	56.729	290	60.48	290	7.426	260	65.59	37	5.680	220	33.87	117	47.688	237
Feb. 9.9	57.019	349	57.58	248	7.686	282	65.22	37	5.900	242	32.70	96	47.925	275
19.9	57.368	399	55.10	197	7.968	301	64.85	41	6.142	261	31.74	67	48.200	308
Mar. 1.8	57.767	438	53.13	137	8.269	316	64.44	45	6.403	275	31.07	35	48.508	332
11.8	58.205	463	51.76	74	8.585	326	63.99	49	6.678	286	30.72	2	48.840	351
21.8	58.668	476	51.02	7	8.911	333	63.50	53	6.964	292	30.70	33	49.191	360
31.8	59.144	477	50.95	58	9.244	335	62.97	55	7.256	295	31.03	67	49.551	362
Apr. 10.7	59.621	465	51.53	122	9.579	333	62.42	55	7.551	293	31.70	97	49.913	356
20.7	60.086	439	52.75	179	9.912	327	61.87	55	7.844	287	32.67	125	50.269	343
30.7	60.525	403	54.54	231	10.239	315	61.32	51	8.131	276	33.92	147	50.612	321
May 10.7	60.928	358	56.85	275	10.554	297	60.81	44	8.407	258	35.39	165	50.933	291
20.6	61.286	302	59.60	309	10.851	274	60.37	38	8.665	238	37.04	176	51.224	255
30.6	61.588	239	62.69	333	11.125	244	59.99	27	8.903	209	38.80	182	51.479	214
June 9.6	61.827	171	66.02	350	11.369	209	59.72	17	9.112	178	40.62	183	51.693	166
19.5	61.998	98	69.52	355	11.578	169	59.55	6	9.290	142	42.45	179	51.859	116
29.5	62.096	23	73.07	351	11.747	125	59.49	6	9.432	101	44.24	171	51.975	61
July 9.5	62.119	53	76.58	341	11.872	79	59.55	15	9.533	60	45.95	157	52.036	6
19.5	62.066	126	79.99	321	11.951	30	59.70	23	9.593	17	47.52	144	52.042	49
29.4	61.940	197	83.20	295	11.981	18	59.93	29	9.610	25	48.96	125	51.993	101
Aug. 8.4	61.743	260	86.15	261	11.963	64	60.22	33	9.585	66	50.21	106	51.892	150
18.4	61.483	317	88.76	224	11.899	104	60.55	33	9.519	101	51.27	87	51.742	194
28.4	61.166	364	91.00	181	11.795	138	60.88	30	9.418	132	52.14	66	51.548	230
Sept. 7.3	60.802	401	92.81	134	11.657	166	61.18	26	9.286	154	52.80	45	51.318	259
17.3	60.401	423	94.15	85	11.491	183	61.44	18	9.132	170	53.25	23	51.059	277
27.3	59.978	435	95.00	33	11.308	188	61.62	9	8.962	175	53.48	3	50.782	284
Oct. 7.2	59.543	431	95.33	21	11.120	184	61.71	1	8.787	170	53.51	19	50.498	281
17.2	59.112	414	95.12	75	10.936	166	61.70	11	8.617	156	53.32	39	50.217	266
27.2	58.698	381	94.37	128	10.770	140	61.59	20	8.461	134	52.93	59	49.951	242
Nov. 6.2	58.317	337	93.09	179	10.630	104	61.39	29	8.327	103	52.34	81	49.709	207
16.1	57.980	281	91.30	226	10.526	63	61.10	34	8.224	68	51.53	99	49.502	164
26.1	57.699	216	89.04	268	10.463	17	60.76	38	8.156	27	50.54	117	49.338	115
Dec. 6.1	57.483	143	86.36	303	10.446	32	60.38	39	8.129	15	49.37	131	49.223	61
16.1	57.340	64	83.33	327	10.478	80	59.99	39	8.144	58	48.06	141	49.162	6
26.0	57.276	16	80.06	341	10.558	126	59.60	39	8.202	97	46.65	147	49.156	52
36.0	57.292		76.65		10.684		59.21		8.299		45.18		49.208	
Mean Place	58.730		71.75		7.114		63.66		5.582		40.76		48.588	
Sec *δ*, Tan *δ*	1.958		+1.683		1.116		−0.496		1.003		+0.072		1.386	
$D_\psi\alpha$, $D_\omega\alpha$	+0.02		−0.02		+0.07		+0.01		+0.06		0.00		+0.04	
$D_\psi\delta$, $D_\omega\delta$	+0.1		−1.0		+0.1		−1.0		+0.1		−1.0		+0.1	

FOR THE UPPER TRANSIT AT WASHINGTON.

gton Time.	γ Lyræ. Mag. 3.3 Right Ascension.		γ Lyræ. Declination.		ε Aquilæ. Mag. 4.2 Right Ascension.		ε Aquilæ. Declination.		ζ Sagittarii. Mag. 2.7 Right Ascension.		ζ Sagittarii. Declination.		ζ Aquilæ. Mag. 3.0 Right Ascension.		ζ Aquilæ. Declination.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	18 55		+32 34		18 55		+14 57		18 57		−29 59		19 1		+13 44	
	s		″		s		″		s		″		s		″	
1.0	49.401	97	28.17	282	50.786	114	14.57	205	19.607	153	63.39	63	35.204	108	19.23	198
11.0	49.498	141	25.35	277	50.900	150	12.52	201	19.760	193	62.76	62	35.312	145	17.25	193
21.0	49.639	182	22.58	260	51.050	183	10.51	188	19.953	229	62.14	61	35.457	179	15.32	182
30.9	49.821	219	19.98	235	51.233	214	8.63	166	20.182	261	61.53	59	35.636	209	13.50	162
. 9.9	50.040	251	17.63	199	51.447	237	6.97	140	20.443	285	60.94	60	35.845	233	11.88	135
19.9	50.291	276	15.64	155	51.684	259	5.57	103	20.728	306	60.34	60	36.078	255	10.53	100
. 1.8	50.567	298	14.09	104	51.943	275	4.54	63	21.034	322	59.74	61	36.333	272	9.53	61
11.8	50.865	312	13.05	48	52.218	287	3.91	21	21.356	334	59.13	61	36.605	284	8.92	20
21.8	51.177	320	12.57	7	52.505	294	3.70	22	21.690	343	58.52	61	36.889	293	8.72	23
31.8	51.497	324	12.64	63	52.799	297	3.92	66	22.033	345	57.91	59	37.182	297	8.95	65
·. 10.7	51.821	321	13.27	116	53.096	295	4.58	106	22.378	344	57.32	56	37.479	296	9.60	105
20.7	52.142	310	14.43	164	53.391	289	5.64	142	22.722	339	56.76	52	37.775	291	10.65	139
30.7	52.452	295	16.07	207	53.680	277	7.06	174	23.061	328	56.24	45	38.066	280	12.04	171
y 10.7	52.747	273	18.14	242	53.957	259	8.80	199	23.389	309	55.79	36	38.346	262	13.75	195
20.6	53.020	243	20.56	270	54.216	236	10.79	218	23.698	288	55.43	25	38.608	242	15.70	214
30.6	53.263	208	23.26	288	54.452	207	12.97	229	23.986	257	55.18	14	38.850	213	17.84	225
ne 9.6	53.471	170	26.14	299	54.659	175	15.26	234	24.243	222	55.04	1	39.063	180	20.09	229
19.5	53.641	126	29.13	302	54.834	138	17.60	233	24.465	181	55.03	12	39.243	144	22.38	229
29.5	53.767	79	32.15	298	54.972	97	19.93	226	24.646	137	55.15	25	39.387	102	24.67	221
ly 9.5	53.846	32	35.13	285	55.069	53	22.19	212	24.783	88	55.40	34	39.489	60	26.88	209
19.5	53.878	17	37.98	266	55.122	10	24.31	197	24.871	39	55.74	42	39.549	16	28.97	193
29.4	53.861	64	40.64	243	55.132	34	26.28	176	24.910	13	56.16	48	39.565	27	30.90	172
g. 8.4	53.797	108	43.07	214	55.098	74	28.04	152	24.897	60	56.64	51	39.538	68	32.62	151
18.4	53.689	148	45.21	182	55.024	111	29.56	126	24.837	103	57.15	50	39.470	105	34.13	125
28.4	53.541	181	47.03	145	54.913	140	30.82	100	24.734	139	57.65	45	39.365	136	35.38	99
pt. 7.3	53.360	207	48.48	106	54.773	166	31.82	70	24.595	169	58.10	37	39.229	162	36.37	70
17.3	53.153	223	49.54	65	54.607	180	32.52	41	24.426	187	58.47	26	39.067	176	37.07	42
27.3	52.930	230	50.19	23	54.427	187	32.93	10	24.239	194	58.73	14	38.891	184	37.49	12
ct. 7.2	52.700	227	50.42	21	54.240	183	33.03	21	24.045	191	58.87	1	38.707	182	37.61	18
17.2	52.473	213	50.21	65	54.057	169	32.82	51	23.854	175	58.88	14	38.525	168	37.43	46
27.2	52.260	192	49.56	107	53.888	149	32.31	82	23.679	150	58.74	28	38.357	149	36.97	76
ov. 6.2	52.068	159	48.49	148	53.739	118	31.49	110	23.529	114	58.46	39	38.208	119	36.21	105
16.1	51.909	122	47.01	186	53.621	84	30.39	137	23.415	72	58.07	48	38.089	84	35.16	130
26.1	51.787	78	45.15	220	53.537	42	29.02	161	23.343	27	57.59	56	38.005	46	33.86	153
ec. 6.1	51.709	32	42.95	249	53.495	1	27.41	181	23.316	25	57.03	60	37.959	4	32.33	174
16.1	51.677	17	40.46	268	53.494	43	25.60	196	23.341	73	56.43	63	37.955	39	30.59	188
26.0	51.694	66	37.78	279	53.537	85	23.64	203	23.414	122	55.80	63	37.994	81	28.71	196
36.0	51.760		34.99		53.622		21.61		23.536		55.17		38.075		26.75	
an Place	50.298		29.74		51.301		16.73		19.884		60.26		35.698		21.13	
: δ, Tan δ	1.187		+0.639		1.035		+0.267		1.155		−0.577		1.029		+0.245	
a, D_m a	+0.04		−0.01		+0.05		0.00		+0.08		+0.01		+0.05		0.00	
δ, D_m δ	+0.1		−1.0		+0.1		−1.0		+0.1		−1.0		+0.1		−1.0	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	λ Aquilæ. Mag. 3.6				α Coronæ Australis. Mag. 4.1				ι Lyræ. Mag. 5.1				π Sagit Mag. 3	
	Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination		Right Ascension.	
	h m 19 1		° ′ − 5 0		h m 19 3		° ′ −38 1		h m 19 4		° ′ +35 57		h m 19 4	
	s		″		s		″		s		″		s	
Jan. 1.0	50.348	124	30.77	92	49.226	155	69.70	115	19.421	82	68.82	291	49.462	135
11.0	50.472	159	31.69	90	49.381	202	68.55	113	19.503	132	65.91	287	49.597	173
21.0	50.631	190	32.59	82	49.583	242	67.42	110	19.635	174	63.04	273	49.770	206
30.9	50.821	218	33.41	69	49.825	275	66.32	106	19.809	213	60.31	246	49.976	235
Feb. 9.9	51.039	240	34.10	54	50.100	306	65.26	100	20.022	248	57.85	210	50.211	261
19.9	51.279	261	34.64	32	50.406	329	64.26	95	20.270	277	55.75	167	50.472	279
Mar. 1.9	51.540	275	34.96	9	50.735	349	63.31	88	20.547	300	54.08	116	50.751	295
11.8	51.815	286	35.05	17	51.084	362	62.43	81	20.847	317	52.92	61	51.046	309
21.8	52.101	295	34.88	42	51.446	372	61.62	72	21.164	329	52.31	1	51.355	317
31.8	52.396	299	34.46	68	51.818	377	60.90	64	21.493	333	52.30	55	51.672	322
Apr. 10.7	52.695	299	33.78	89	52.195	377	60.26	52	21.826	330	52.85	110	51.994	322
20.7	52.994	295	32.89	108	52.572	372	59.74	40	22.156	323	53.95	162	52.316	319
30.7	53.289	285	31.81	125	52.944	360	59.34	25	22.479	306	55.57	207	52.635	308
May 10.7	53.574	271	30.56	135	53.304	341	59.09	10	22.785	284	57.64	244	52.943	295
20.6	53.845	249	29.21	140	53.645	317	58.99	6	23.069	254	60.08	274	53.238	274
30.6	54.094	224	27.81	142	53.962	286	59.05	25	23.323	219	62.82	296	53.512	246
June 9.6	54.318	194	26.39	140	54.248	246	59.30	40	23.542	178	65.78	310	53.758	214
19.6	54.512	157	24.99	133	54.494	203	59.70	55	23.720	134	68.88	314	53.972	177
29.5	54.669	117	23.66	123	54.697	153	60.25	70	23.854	86	72.02	310	54.149	134
July 9.5	54.786	76	22.43	110	54.850	100	60.95	79	23.940	36	75.12	299	54.283	89
19.5	54.862	32	21.33	98	54.950	44	61.74	87	23.976	15	78.11	283	54.372	42
29.4	54.894	12	20.35	83	54.994	9	62.61	91	23.961	64	80.94	258	54.414	4
Aug. 8.4	54.882	53	19.52	67	54.985	63	63.52	90	23.897	109	83.52	230	54.410	49
18.4	54.829	89	18.85	52	54.922	110	64.42	84	23.788	152	85.82	197	54.361	89
28.4	54.740	123	18.33	38	54.812	152	65.26	73	23.636	186	87.79	160	54.272	125
Sept. 7.3	54.617	147	17.95	24	54.660	184	65.99	61	23.450	214	89.39	120	54.147	152
17.3	54.470	164	17.71	11	54.476	206	66.60	42	23.236	233	90.59	78	53.995	172
27.3	54.306	170	17.60	2	54.270	216	67.02	21	23.003	242	91.37	34	53.823	179
Oct. 7.3	54.136	167	17.62	14	54.054	212	67.23	0	22.761	240	91.71	12	53.644	177
17.2	53.969	155	17.76	27	53.842	199	67.23	24	22.521	229	91.59	58	53.467	163
27.2	53.814	134	18.03	38	53.643	171	66.99	44	22.292	207	91.01	101	53.304	141
Nov. 6.2	53.680	104	18.41	49	53.472	134	66.55	65	22.085	177	90.00	147	53.163	109
16.1	53.576	68	18.90	61	53.338	90	65.90	82	21.908	140	88.53	185	53.054	71
26.1	53.508	28	19.51	72	53.248	39	65.08	95	21.768	96	86.68	221	52.983	28
Dec. 6.1	53.480	13	20.23	80	53.209	15	64.13	105	21.672	48	84.47	253	52.955	17
16.1	53.493	55	21.03	88	53.224	69	63.08	111	21.624	2	81.94	274	52.972	62
26.0	53.548	96	21.91	91	53.293	120	61.97	114	21.626	51	79.20	287	53.034	105
36.0	53.644		22.82		53.413		60.83		21.677		76.33		53.139	
Mean Place	50.651		28.20		49.557		66.34		20.420		69.57		49.713	
Sec δ, Tan δ	1.004		−0.088		1.270		−0.782		1.236		+0.726		1.072	
$D_\psi a$, $D_\omega a$	+0.06		0.00		+0.08		+0.01		+0.04		−0.01		+0.07	
$D_\psi \delta$, $D_\omega \delta$	+0.1		−1.0		+0.1		−1.0		+0.1		−1.0		+0.1	

FOR THE UPPER TRANSIT AT WASHINGTON.

ngton Time.	ψ Sagittarii. Mag. 4.9 Right Ascension.		ψ Sagittarii. Declination.		δ Draconis. Mag. 3.2 Right Ascension.		δ Draconis. Declination.		d Sagittarii. Mag. 5.0 Right Ascension.		d Sagittarii. Declination.		θ Lyræ. Mag. 4.5 Right Ascension.		θ Lyræ. Declination.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	19 10		−25 23		19 12		+67 30		19 12		−19 5		19 13		+37 58	
	s		″		s		″		s		″		s		″	
. 1.0	26.881	130	66.12	38	28.76	1	57.42	342	46.514	125	68.82	1	28.124	70	67.33	295
11.0	27.011	172	65.74	40	28.75	10	54.00	343	46.639	163	68.83	1	28.194	118	64.38	293
21.0	27.183	208	65.34	41	28.85	20	50.57	332	46.802	194	68.82	5	28.312	164	61.45	280
30.9	27.391	238	64.93	43	29.05	30	47.25	306	46.996	225	68.77	11	28.476	205	58.65	255
b. 9.9	27.629	264	64.50	48	29.35	39	44.19	270	47.221	250	68.66	18	28.681	243	56.10	220
19.9	27.893	284	64.02	52	29.74	48	41.49	223	47.471	270	68.48	29	28.924	274	53.90	178
r. 1.9	28.177	303	63.50	58	30.22	53	39.26	167	47.741	287	68.19	40	29.198	300	52.12	126
11.8	28.480	316	62.92	63	30.75	58	37.59	106	48.028	302	67.79	52	29.498	320	50.86	70
21.8	28.796	325	62.29	69	31.33	60	36.53	39	48.330	311	67.27	63	29.818	333	50.16	11
31.8	29.121	332	61.60	72	31.93	61	36.14	26	48.641	316	66.64	73	30.151	340	50.05	48
r. 10.7	29.453	333	60.88	73	32.54	61	36.40	92	48.957	319	65.91	81	30.491	340	50.53	104
20.7	29.786	329	60.15	73	33.15	58	37.32	152	49.276	316	65.10	87	30.831	332	51.57	156
30.7	30.115	321	59.42	69	33.73	54	38.84	208	49.592	307	64.23	90	31.163	318	53.13	204
y 10.7	30.436	305	58.73	64	34.27	47	40.92	255	49.899	294	63.33	88	31.481	294	55.17	244
20.6	30.741	286	58.09	55	34.74	41	43.47	295	50.193	276	62.45	85	31.775	266	57.61	275
30.6	31.027	259	57.54	46	35.15	33	46.42	325	50.469	248	61.60	78	32.041	231	60.36	299
ne 9.6	31.286	225	57.08	33	35.48	24	49.67	347	50.717	217	60.82	68	32.272	189	63.35	313
19.6	31.511	188	56.75	19	35.72	15	53.14	358	50.934	182	60.14	58	32.461	144	66.48	320
29.5	31.699	144	56.56	8	35.87	3	56.72	362	51.116	140	59.56	45	32.605	93	69.68	319
ly 9.5	31.843	98	56.48	5	35.90	6	60.34	354	51.256	97	59.11	32	32.698	43	72.87	308
19.5	31.941	50	56.53	16	35.84	15	63.88	341	51.353	48	58.79	20	32.741	8	75.95	293
29.4	31.991	1	56.69	25	35.69	24	67.29	320	51.401	3	58.59	10	32.733	60	78.88	271
ug. 8.4	31.992	45	56.94	31	35.45	33	70.49	291	51.404	41	58.49	0	32.673	107	81.59	243
18.4	31.947	88	57.25	34	35.12	42	73.40	256	51.363	83	58.49	7	32.566	151	84.02	209
28.4	31.859	125	57.59	35	34.70	48	75.96	216	51.280	119	58.56	14	32.415	187	86.11	173
pt. 7.3	31.734	155	57.94	32	34.22	54	78.12	172	51.161	146	58.70	15	32.228	218	87.84	133
17.3	31.579	174	58.26	26	33.68	57	79.84	123	51.015	167	58.85	15	32.010	238	89.17	91
27.3	31.405	184	58.52	19	33.11	59	81.07	72	50.848	177	59.00	15	31.772	248	90.08	46
t. 7.3	31.221	183	58.71	10	32.52	60	81.79	18	50.671	174	59.15	13	31.524	249	90.54	1
17.2	31.038	170	58.81	0	31.92	58	81.97	37	50.497	164	59.28	9	31.275	239	90.53	47
27.2	30.868	149	58.81	9	31.34	56	81.60	92	50.333	141	59.37	7	31.036	218	90.06	93
ov. 6.2	30.719	116	58.72	17	30.78	50	80.68	146	50.192	112	59.44	4	30.818	191	89.13	139
16.1	30.603	78	58.55	25	30.28	45	79.22	198	50.080	76	59.48	3	30.627	153	87.74	182
26.1	30.525	35	58.30	30	29.83	37	77.24	243	50.004	35	59.51	1	30.474	110	85.92	219
ec. 6.1	30.490	11	58.00	34	29.46	29	74.81	282	49.969	9	59.52	1	30.364	63	83.73	251
16.1	30.501	58	57.66	36	29.17	18	71.99	315	49.978	53	59.53	2	30.301	14	81.22	275
26.0	30.559	102	57.30	38	28.99	7	68.84	334	50.031	95	59.55	1	30.287	37	78.47	290
36.0	30.661		56.92		28.92		65.50		50.126		59.56		30.324		75.57	
n Place	27.129		62.96		32.414		55.85		46.758		65.88		29.188		67.19	
δ, Tan δ	1.107		−0.475		2.615		+2.416		1.058		−0.346		1.269		+0.781	
, $D_\omega\, \alpha$	+0.07		+0.01		0.00		−0.05		+0.07		+0.01		+0.04		−0.02	
, $D_\omega\, \delta$	*+0.1*		*−1.0*		*+0.1*		*−1.0*		+0.1		−1.0		+0.1		−0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ω Aquilæ. Mag. 5.1 Right Ascension.		ω Aquilæ. Declination.		κ Cygni. Mag. 4.0 Right Ascension.		κ Cygni. Declination.		τ Draconis. Mag. 4.6 Right Ascension.		τ Draconis. Declination.		δ Aq[uilæ] Ma[g.] Right Ascension
	h m 19 13		° ′ +11 26		h m 19 15		° ′ +53 12		h m 19 17		° ′ +73 11		h m 19 21
	s		″		s		″		s		″		s
Jan. 1.0	54.783		40.09		9.264		54.67		4.32		68.70		18.471
11.0	54.880	97	38.28	181	9.304	40	51.37	330	4.26	6	65.32	338	18.568
21.0	55.015	135	36.49	179	9.409	105	48.07	330	4.33	7	61.90	342	18.703
30.9	55.183	168	34.82	167	9.578	169	44.89	318	4.55	22	58.57	333	18.870
Feb. 9.9	55.382	199	33.32	150	9.807	229	41.97	292	4.91	36	55.48	309	19.065
19.9	55.606	224	32.08	124	10.088	281	39.41	256	5.38	47	52.73	275	19.286
Mar. 1.9	55.852	246	31.14	94	10.416	328	37.32	209	5.96	58	50.43	230	19.529
11.8	56.117	265	30.58	56	10.782	366	35.77	155	6.63	67	48.68	175	19.791
21.8	56.396	279	30.41	17	11.177	395	34.84	93	7.36	73	47.54	114	20.067
31.8	56.685	289	30.65	24	11.589	412	34.54	30	8.14	78	47.05	49	20.354
Apr. 10.8	56.980	295	31.29	64	12.009	420	34.88	34	8.92	78	47.21	16	20.648
20.7	57.278	298	32.31	102	12.427	418	35.87	99	9.70	78	48.02	81	20.946
30.7	57.572	294	33.67	136	12.832	405	37.43	156	10.45	75	49.45	143	21.242
May 10.7	57.857	285	35.33	166	13.215	383	39.52	209	11.14	69	51.43	198	21.531
20.6	58.127	270	37.21	188	13.565	350	42.08	256	11.75	61	53.90	247	21.808
30.6	58.376	249	39.28	207	13.874	309	45.01	293	12.27	52	56.77	287	22.065
June 9.6	58.599	223	41.45	217	14.133	259	48.21	320	12.67	40	59.97	320	22.298
19.6	58.792	193	43.67	222	14.338	205	51.61	340	12.95	28	63.38	341	22.501
29.5	58.948	156	45.88	221	14.481	143	55.13	352	13.12	17	66.95	357	22.670
July 9.5	59.064	116	48.01	213	14.561	80	58.64	351	13.15	3	70.55	360	22.799
19.5	59.138	74	50.03	202	14.575	14	62.08	344	13.04	11	74.10	355	22.887
29.5	59.168	30	51.90	187	14.523	52	65.38	330	12.82	22	77.53	343	22.931
Aug. 8.4	59.154	14	53.57	167	14.408	115	68.46	308	12.48	34	80.77	324	22.932
18.4	59.098	56	55.04	147	14.233	175	71.25	279	12.02	46	83.74	297	22.891
28.4	59.005	93	56.26	122	14.005	228	73.68	243	11.45	57	86.37	263	22.811
Sept. 7.3	58.879	126	57.23	97	13.731	274	75.73	205	10.79	66	88.62	225	22.697
17.3	58.727	152	57.93	70	13.420	311	77.34	161	10.08	71	90.43	181	22.556
27.3	58.556	171	58.37	44	13.083	337	78.47	113	9.31	77	91.77	134	22.396
Oct. 7.3	58.377	179	58.53	16	12.730	353	79.10	63	8.50	81	92.61	84	22.227
17.2	58.199	178	58.41	12	12.377	353	79.22	12	7.68	82	92.91	30	22.058
27.2	58.032	167	58.03	38	12.033	344	78.81	41	6.88	80	92.66	25	21.898
Nov. 6.2	57.883	149	57.37	66	11.710	323	77.85	96	6.11	77	91.86	80	21.755
16.2	57.761	122	56.45	92	11.422	288	76.39	146	5.40	71	90.51	135	21.639
26.1	57.671	90	55.28	117	11.177	245	74.45	194	4.77	63	88.65	186	21.555
Dec. 6.1	57.620	51	53.89	139	10.984	193	72.07	238	4.23	54	86.31	234	21.507
16.1	57.609	11	52.31	158	10.851	133	69.31	276	3.80	43	83.56	275	21.499
26.0	57.639	30	50.60	171	10.781	70	66.26	305	3.50	30	80.48	308	21.531
36.0	57.710	71	48.80	180	10.778	3	63.02	324	3.35	15	77.18	330	21.603
Mean Place	55.236		41.49		11.130		53.51		9.537		66.36		18.819
Sec δ, Tan δ	1.020		+0.202		1.670		+1.337		3.460		+3.312		1.001
$D_\psi \alpha$, $D_\omega \alpha$	+0.06		0.00		+0.03		−0.03		−0.02		−0.07		+0.06
$D_\psi \delta$, $D_\omega \delta$	+0.1		−0.9		+0.1		−0.9		+0.1		−0.9		+0.1

FOR THE UPPER TRANSIT AT WASHINGTON.

ington Time.	β Cygni. Mag. 3.2				ι Cygni. Mag. 3.9				μ Aquilæ. Mag. 4.6				h Sagittarii. Mag. 4.7			
	Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	19 27		+27 46		19 27		+51 32		19 30		+ 7 11		19 31		−25 3	
	s		″		s		″		s		″		s		″	
1.0	21.686		64.94		35.110		71.22		1.730		66.15		39.235		67.46	
11.0	21.754	68	62.40	254	35.135	25	67.99	323	1.817	87	64.61	154	39.344	109	67.05	41
21.0	21.864	110	59.87	253	35.224	89	64.74	325	1.940	123	63.09	152	39.493	149	66.60	45
31.0	22.013	149	57.45	242	35.373	149	61.59	315	2.095	155	61.66	143	39.677	184	66.11	49
b. 9.9	22.197	184	55.24	221	35.580	207	58.66	293	2.280	185	60.41	125	39.893	216	65.57	54
19.9	22.415	218	53.32	192	35.839	259	56.06	260	2.493	213	59.36	105	40.137	244	64.98	59
r. 1.9	22.662	247	51.79	153	36.145	306	53.91	215	2.729	236	58.60	76	40.405	268	64.33	65
11.8	22.932	270	50.71	108	36.490	345	52.29	162	2.985	256	58.15	45	40.693	288	63.60	73
21.8	23.221	289	50.12	59	36.864	374	51.25	104	3.257	272	58.07	8	40.998	305	62.81	79
31.8	23.526	305	50.06	6	37.261	397	50.85	40	3.541	284	58.36	29	41.316	318	61.97	84
r. 10.8	23.839	313	50.54	48	37.668	407	51.08	23	3.834	293	59.01	65	41.643	327	61.08	89
20.7	24.155	316	51.52	98	38.077	409	51.93	85	4.132	298	59.99	98	41.976	333	60.17	91
30.7	24.468	313	52.97	145	38.477	400	53.39	146	4.429	297	61.29	130	42.309	333	59.27	90
y 10.7	24.771	303	54.82	185	38.859	382	55.38	199	4.720	291	62.86	157	42.637	328	58.40	87
20.7	25.059	288	57.05	223	39.212	353	57.83	245	4.999	279	64.63	177	42.954	317	57.60	80
30.6	25.323	264	59.56	251	39.528	316	60.67	284	5.259	260	66.55	192	43.252	298	56.90	70
ne 9.6	25.560	237	62.27	271	39.799	271	63.82	315	5.497	238	68.57	202	43.526	274	56.30	60
19.6	25.761	201	65.11	284	40.019	220	67.18	336	5.705	208	70.64	207	43.769	243	55.83	47
29.5	25.922	161	68.01	290	40.181	162	70.66	348	5.878	173	72.67	203	43.975	206	55.51	32
ly 9.5	26.040	118	70.88	287	40.282	101	74.17	351	6.012	134	74.63	196	44.139	164	55.36	15
19.5	26.112	72	73.67	279	40.319	37	77.63	346	6.105	93	76.49	186	44.258	119	55.34	2
29.5	26.136	24	76.30	263	40.293	26	80.97	334	6.154	49	78.18	169	44.328	70	55.45	11
ug. 8.4	26.113	23	78.74	244	40.203	90	84.10	313	6.159	5	79.71	153	44.349	21	55.69	24
18.4	26.045	68	80.92	218	40.055	148	86.96	286	6.122	37	81.04	133	44.322	27	56.00	31
28.4	25.935	110	82.82	190	39.854	201	89.49	253	6.045	77	82.13	109	44.250	72	56.37	37
pt. 7.4	25.790	145	84.39	157	39.606	248	91.65	216	5.934	111	83.01	88	44.139	111	56.77	40
17.3	25.615	175	85.61	122	39.321	285	93.38	173	5.796	138	83.64	63	43.996	143	57.16	39
27.3	25.420	195	86.45	84	39.006	315	94.65	127	5.636	160	84.04	40	43.829	167	57.52	36
ct. 7.3	25.213	207	86.92	47	38.676	330	95.43	78	5.466	170	84.20	16	43.650	179	57.81	29
17.2	25.003	210	86.98	6	38.340	336	95.69	26	5.294	172	84.13	7	43.467	183	58.01	20
27.2	24.801	202	86.63	35	38.011	329	95.44	25	5.130	164	83.81	32	43.293	174	58.12	11
ov. 6.2	24.616	185	85.88	75	37.702	309	94.66	78	4.982	148	83.29	52	43.139	154	58.13	1
16.2	24.456	160	84.74	114	37.422	280	93.36	130	4.858	124	82.51	78	43.012	127	58.04	9
26.1	24.328	128	83.23	151	37.180	242	91.56	180	4.764	94	81.51	97	42.918	94	57.87	17
ec. 6.1	24.237	91	81.39	184	36.987	193	89.32	224	4.707	57	80.37	117	42.866	52	57.61	26
16.1	24.188	49	79.26	213	36.850	137	86.69	263	4.688	19	79.05	132	42.857	9	57.31	30
26.1	24.183	5	76.91	235	36.771	79	83.74	295	4.708	20	77.61	144	42.893	36	56.96	35
36.0	24.221	38	74.42	249	36.755	16	80.60	314	4.768	60	76.08	153	42.973	80	56.57	39
an Place	22.426		64.40		36.836		68.92		2.113		67.10		39.459		64.19	
: δ, Tan δ	1.130		+0.527		1.608		+1.260		1.008		+0.127		1.104		−0.468	
a, $D_\omega \alpha$	+0.05		−0.01		+0.03		−0.03		+0.06		0.00		+0.07		+0.01	
δ, $D_\omega \delta$	+0.1		−0.9		+0.1		−0.9		+0.2		−0.9		+0.2		−0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	κ Aquilæ. Mag. 5.0 Right Ascension.		κ Aquilæ. Declination.		θ Cygni. Mag. 4.6 Right Ascension.		θ Cygni. Declination.		54 Sagittarii. Mag. 5.4 Right Ascension.		54 Sagittarii. Declination.		β Sag… Mag. … Right Ascension.	
	h m		° ′		h m		° ′		h m		° ′		h m	
	19 32		−7 12		19 34		+50 1		19 35		−16 28		19 37	
	s		″		s		″		s		″		s	
Jan. 1.0	25.381	94	48.17	69	11.352	19	44.90	317	57.948	97	66.99	12	18.730	70
11.0	25.475	131	48.86	65	11.371	80	41.73	320	58.045	136	67.11	7	18.800	107
21.0	25.606	164	49.51	60	11.451	140	38.53	312	58.181	170	67.18	2	18.907	143
31.0	25.770	192	50.11	47	11.591	195	35.41	292	58.351	200	67.20	7	19.050	176
Feb. 9.9	25.962	220	50.58	31	11.786	246	32.49	259	58.551	226	67.13	17	19.226	205
19.9	26.182	240	50.89	13	12.032	292	29.90	216	58.777	250	66.96	30	19.431	231
Mar. 1.9	26.422	261	51.02	7	12.324	330	27.74	165	59.027	268	66.66	44	19.662	254
11.8	26.683	276	50.95	32	12.654	361	26.09	107	59.295	286	66.22	58	19.916	272
21.8	26.959	289	50.63	55	13.015	383	25.02	44	59.581	300	65.64	73	20.188	287
31.8	27.248	297	50.08	77	13.398	397	24.58	18	59.881	309	64.91	86	20.475	297
Apr. 10.8	27.545	303	49.31	98	13.795	399	24.76	80	60.190	314	64.05	97	20.772	302
20.7	27.848	303	48.33	116	14.194	393	25.56	141	60.504	316	63.08	105	21.074	302
30.7	28.151	298	47.17	128	14.587	378	26.97	193	60.820	311	62.03	110	21.376	296
May 10.7	28.449	288	45.89	138	14.965	351	28.90	241	61.131	300	60.93	111	21.672	285
20.7	28.737	271	44.51	143	15.316	317	31.31	279	61.431	285	59.82	108	21.957	265
30.6	29.008	248	43.08	142	15.633	275	34.10	311	61.716	261	58.74	103	22.222	241
June 9.6	29.256	219	41.66	140	15.908	226	37.21	333	61.977	234	57.71	93	22.463	210
19.6	29.475	186	40.26	131	16.134	171	40.54	345	62.211	198	56.78	82	22.673	174
29.5	29.661	149	38.95	120	16.305	112	43.99	350	62.409	159	55.96	67	22.847	134
July 9.5	29.810	104	37.75	107	16.417	50	47.49	346	62.568	115	55.29	54	22.981	92
19.5	29.914	61	36.68	93	16.467	12	50.95	334	62.683	70	54.75	40	23.073	47
29.5	29.975	17	35.75	76	16.455	73	54.29	314	62.753	24	54.35	25	23.120	1
Aug. 8.4	29.992	28	34.99	61	16.382	130	57.43	290	62.777	22	54.10	13	23.121	42
18.4	29.964	67	34.38	46	16.252	184	60.33	256	62.755	65	53.97	3	23.079	83
28.4	29.897	104	33.92	32	16.068	231	62.89	220	62.690	101	53.94	7	22.996	118
Sept. 7.4	29.793	131	33.60	17	15.837	269	65.09	178	62.589	133	54.01	13	22.878	147
17.3	29.662	153	33.43	7	15.568	297	66.87	133	62.456	154	54.14	16	22.731	169
27.3	29.509	166	33.36	4	15.271	314	68.20	85	62.302	169	54.30	19	22.562	181
Oct. 7.3	29.343	166	33.40	16	14.957	321	69.05	35	62.133	171	54.49	20	22.381	184
17.2	29.177	159	33.56	25	14.636	315	69.40	18	61.962	163	54.69	19	22.197	178
27.2	29.018	143	33.81	33	14.321	298	69.22	70	61.799	148	54.88	19	22.019	163
Nov. 6.2	28.875	118	34.14	41	14.023	271	68.52	121	61.651	122	55.07	17	21.856	141
16.2	28.757	87	34.55	49	13.752	234	67.31	171	61.529	90	55.24	16	21.715	110
26.1	28.670	51	35.04	56	13.518	188	65.60	216	61.439	52	55.40	16	21.605	76
Dec. 6.1	28.619	11	35.60	62	13.330	136	63.44	255	61.387	12	55.56	15	21.529	38
16.1	28.608	29	36.22	67	13.194	80	60.89	286	61.375	30	55.71	14	21.491	1
26.1	28.637	69	36.89	73	13.114	20	58.03	310	61.405	71	55.85	13	21.492	43
36.0	28.706		37.62		13.094		54.93		61.476		55.98		21.535	
Mean Place	25.638		46.14		12.963		42.06		58.167		64.31		19.243	
Sec δ, Tan δ	1.008		−0.127		1.557		+1.193		1.043		−0.296		1.048	
$D_\psi a$, $D_\omega a$	+0.06		0.00		+0.03		−0.03		+0.07		+0.01		+0.05	
$D_\psi \delta$, $D_\omega \delta$	+0.2		−0.9		+0.2		−0.9		+0.2		−0.9		+0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

ington Time.	15 Cygni. Mag. 5.0 Right Ascension.		Declination.		*f* Sagittarii. Mag. 5.1 Right Ascension.		Declination.		γ Aquilæ. Mag. 2.8 Right Ascension.		Declination.		δ Cygni. Mag. 3.0 Right Ascension.		Declination.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	19 41		+37 8		19 41		−19 57		19 42		+10 21		19 42		+44 55	
	s		″		s		″		s		″		s		″	
1.0	16.044	39	74.39	280	31.089	94	44.50	12	18.413	71	36.36	168	21.588	22	42.44	304
11.0	16.063	87	71.59	284	31.183	133	44.38	16	18.484	108	34.68	165	21.610	76	39.40	307
21.0	16.170	131	68.75	277	31.316	167	44.22	23	18.592	141	33.03	157	21.686	128	36.33	300
31.0	16.301	174	65.98	256	31.483	199	43.99	29	18.733	173	31.46	142	21.814	178	33.33	282
. 9.9	16.475	213	63.42	227	31.682	225	43.70	38	18.906	202	30.04	118	21.992	224	30.51	250
19.9	16.688	249	61.15	187	31.907	251	43.32	48	19.108	225	28.86	89	22.216	266	28.01	210
. 1.9	16.937	278	59.28	141	32.158	270	42.84	60	19.333	249	27.97	55	22.482	301	25.91	161
11.9	17.215	304	57.87	87	32.428	288	42.24	72	19.582	266	27.42	18	22.783	330	24.30	105
21.8	17.519	322	57.00	31	32.716	304	41.52	82	19.848	281	27.24	22	23.113	353	23.25	44
31.8	17.841	334	56.69	26	33.020	313	40.70	91	20.129	292	27.46	61	23.466	366	22.81	16
. 10.8	18.175	340	56.95	83	33.333	320	39.79	100	20.421	298	28.07	98	23.832	372	22.97	76
20.7	18.515	340	57.78	136	33.653	322	38.79	104	20.719	300	29.05	132	24.204	369	23.73	134
30.7	18.855	329	59.14	186	33.975	319	37.75	105	21.019	295	30.37	162	24.573	356	25.07	186
y 10.7	19.184	311	61.00	227	34.294	308	36.70	103	21.314	285	31.99	185	24.929	338	26.93	232
20.7	19.495	290	63.27	263	34.602	294	35.67	98	21.599	267	33.84	204	25.267	308	29.25	271
30.6	19.785	257	65.90	289	34.896	271	34.69	89	21.866	245	35.88	216	25.575	271	31.96	302
ne 9.6	20.042	218	68.79	310	35.167	241	33.80	78	22.111	216	38.04	222	25.846	228	34.98	322
19.6	20.260	176	71.89	318	35.408	207	33.02	64	22.327	183	40.26	221	26.074	180	38.20	336
29.6	20.436	129	75.07	320	35.615	167	32.38	51	22.510	143	42.47	216	26.254	127	41.56	340
y 9.5	20.565	79	78.27	315	35.782	123	31.87	35	22.653	101	44.63	205	26.381	70	44.96	337
19.5	20.644	26	81.42	302	35.905	77	31.52	19	22.754	57	46.68	190	26.451	13	48.33	326
29.5	20.670	26	84.44	285	35.982	29	31.33	7	22.811	13	48.58	172	26.464	44	51.59	306
g. 8.4	20.644	75	87.29	259	36.011	17	31.26	4	22.824	31	50.30	152	26.420	99	54.65	283
18.4	20.569	121	89.88	230	35.994	61	31.30	15	22.793	71	51.82	129	26.321	148	57.48	251
28.4	20.448	161	92.18	194	35.933	99	31.45	23	22.722	106	53.11	104	26.173	192	59.99	216
pt. 7.4	20.287	192	94.12	157	35.834	133	31.68	26	22.616	135	54.15	79	25.981	229	62.15	177
17.3	20.095	221	95.69	116	35.701	157	31.94	28	22.481	158	54.94	53	25.752	257	63.92	133
27.3	19.874	235	96.85	74	35.544	170	32.22	26	22.323	170	55.47	26	25.495	274	65.25	86
t. 7.3	19.639	240	97.59	28	35.374	174	32.48	23	22.153	174	55.73	0	25.221	281	66.11	39
17.3	19.399	235	97.87	18	35.200	168	32.71	19	21.979	168	55.73	25	24.940	277	66.50	12
27.2	19.164	221	97.69	65	35.032	152	32.90	15	21.811	154	55.48	53	24.663	262	66.38	62
v. 6.2	18.943	198	97.04	111	34.880	127	33.05	9	21.657	132	54.95	78	24.401	238	65.76	112
16.2	18.745	166	95.93	153	34.753	96	33.14	5	21.525	103	54.17	101	24.163	205	64.64	159
26.1	18.579	129	94.40	193	34.657	58	33.19	1	21.422	69	53.16	123	23.958	164	63.05	203
c. 6.1	18.450	85	92.47	227	34.599	17	33.20	3	21.353	33	51.93	141	23.794	117	61.02	241
16.1	18.365	40	90.20	255	34.582	25	33.17	6	21.320	6	50.52	156	23.677	67	58.61	272
26.1	18.325	7	87.65	275	34.607	67	33.11	10	21.326	44	48.96	164	23.610	14	55.89	294
36.0	18.332		84.90		34.674		33.01		21.370		47.32		23.596		52.95	
n Place	17.033		72.00		31.295		41.56		18.817		36.48		22.897		39.24	
δ, Tan δ	1.255		+0.758		1.064		−0.363		1.017		+0.184		1.412		+0.997	
$D_\omega \alpha$	+0.04		−0.02		+0.07		+0.01		+0.06		−0.01		+0.04		−0.03	
$D_\omega \delta$	+0.2		−0.9		+0.2		−0.9		+0.2		−0.9		+0.2		−0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	δ Sagittæ. Mag. 3.8 Right Ascension.		δ Sagittæ. Declination.		α Aquilæ. (Altair.) Mag. 0.9 Right Ascension.		α Aquilæ. Declination.		η Aquilæ. Var. 3.7–4.4 Right Ascension.		η Aquilæ. Declination.		ε Draconis. Mag. 4 Right Ascension.	
	h m		° ′		h m		° ′		h m		° ′		h m	
	19 43		+18 19		19 46		+ 8 38		19 48		+ 0 47		19 48	
	s		″		s		″		s		″		s	
Jan. 1.0	40.696	62	44.37	206	43.646	73	53.37	155	14.429	74	29.47	111	23.64	12
11.0	40.758	100	42.31	206	43.719	108	51.82	153	14.503	110	28.36	110	23.52	0
21.0	40.858	135	40.25	197	43.827	141	50.29	145	14.613	141	27.26	102	23.52	12
31.0	40.993	170	38.28	181	43.968	173	48.84	129	14.754	173	26.24	88	23.64	23
Feb. 9.9	41.163	200	36.47	154	44.141	201	47.55	106	14.927	200	25.36	68	23.87	34
19.9	41.363	225	34.93	122	44.342	226	46.49	79	15.127	223	24.68	46	24.21	45
Mar. 1.9	41.588	251	33.71	84	44.568	247	45.70	46	15.350	245	24.22	18	24.66	53
11.9	41.839	270	32.87	40	44.815	267	45.24	9	15.595	264	24.04	12	25.19	60
21.8	42.109	286	32.47	5	45.082	280	45.15	28	15.859	278	24.16	42	25.79	64
31.8	42.395	297	32.52	50	45.362	292	45.43	66	16.137	290	24.58	72	26.43	68
Apr. 10.8	42.692	304	33.02	94	45.654	299	46.09	100	16.427	298	25.30	100	27.11	68
20.7	42.996	304	33.96	135	45.953	300	47.09	134	16.725	300	26.30	128	27.79	67
30.7	43.300	300	35.31	171	46.253	297	48.43	162	17.025	297	27.58	146	28.46	64
May 10.7	43.600	288	37.02	202	46.550	286	50.05	184	17.322	289	29.04	165	29.10	59
20.7	43.888	270	39.04	224	46.836	271	51.89	201	17.611	274	30.69	175	29.69	52
30.6	44.158	246	41.28	242	47.107	247	53.90	213	17.885	252	32.44	180	30.21	44
June 9.6	44.404	215	43.70	253	47.354	218	56.03	216	18.137	225	34.24	182	30.65	34
19.6	44.619	180	46.23	255	47.572	186	58.19	216	18.362	193	36.06	177	30.99	25
29.6	44.799	140	48.78	252	47.758	147	60.35	208	18.555	155	37.83	167	31.24	13
July 9.5	44.939	97	51.30	244	47.905	105	62.43	198	18.710	113	39.50	157	31.37	3
19.5	45.036	51	53.74	230	48.010	61	64.41	183	18.823	70	41.07	142	31.40	9
29.5	45.087	6	56.04	210	48.071	16	66.24	165	18.893	26	42.49	123	31.31	19
Aug. 8.4	45.093	38	58.14	189	48.087	26	67.89	144	18.919	17	43.72	106	31.12	30
18.4	45.055	79	60.03	163	48.061	67	69.33	121	18.902	59	44.78	86	30.82	39
28.4	44.976	115	61.66	136	47.994	102	70.54	99	18.843	95	45.64	66	30.43	47
Sept. 7.4	44.861	145	63.02	104	47.892	132	71.53	73	18.748	125	46.30	47	29.96	55
17.3	44.716	168	64.06	74	47.760	153	72.26	49	18.623	146	46.77	28	29.41	60
27.3	44.548	180	64.80	43	47.607	168	72.75	23	18.477	161	47.05	10	28.81	64
Oct. 7.3	44.368	185	65.23	8	47.439	170	73.98	1	18.316	166	47.15	8	28.17	66
17.3	44.183	180	65.31	24	47.269	164	72.97	26	18.150	161	47.07	26	27.51	66
27.2	44.003	166	65.07	57	47.105	152	72.71	49	17.989	149	46.81	42	26.85	65
Nov. 6.2	43.837	144	64.50	89	46.953	129	72.22	74	17.840	126	46.39	58	26.20	62
16.2	43.693	115	63.61	120	46.824	101	71.48	94	17.714	98	45.81	73	25.58	55
26.1	43.578	82	62.41	147	46.723	67	70.54	116	17.616	64	45.08	86	25.03	49
Dec. 6.1	43.496	45	60.94	172	46.656	31	69.38	132	17.552	28	44.22	97	24.54	40
16.1	43.451	5	59.22	190	46.625	8	68.06	144	17.524	10	43.25	107	24.14	31
26.1	43.446	35	57.32	202	46.633	45	66.62	153	17.534	48	42.18	111	23.83	19
36.0	43.481		55.30		46.678		65.09		17.582		41.07		23.64	
Mean Place	41.215		43.62		44.024		53.59		14.719		30.35		27.750	
Sec δ, Tan δ	1.053		+0.331		1.012		+0.152		1.000		+0.014		2.932	
$D_\psi \alpha$, $D_\omega \alpha$	+0.05		−0.01		+0.06		0.00		+0.06		0.00		0.00	
$D_\psi \delta$, $D_\omega \delta$	+0.2		−0.9		+0.2		−0.9		+0.2		−0.9		+0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

...ington ... Time.	ι Sagittarii. Mag. 4.2 Right Ascension.		Declination.		ε Pavonis. Mag. 4.1 Right Ascension.		Declination.		β Aquilæ. Mag. 3.9 Right Ascension.		Declination.		γ Sagittæ. Mag. 3.7 Right Ascension.		Declination.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	19 49		−42 5		19 50		−73 7		19 51		+6 11		19 55		+19 15	
	s		″		s		″		s		″		s		″	
.. 1.1	31.909	99	19.32	149	58.82	12	57.44	307	13.837	66	54.90	143	3.417	50	58.96	206
11.0	32.008	148	17.83	156	58.94	26	54.37	311	13.903	102	53.47	141	3.467	87	56.90	207
21.0	32.156	194	16.27	159	59.20	37	51.26	307	14.005	135	52.06	134	3.554	125	54.83	200
31.0	32.350	233	14.68	159	59.57	50	48.19	297	14.140	167	50.72	118	3.679	158	52.83	185
b. 9.9	32.583	271	13.09	157	60.07	59	45.22	280	14.307	194	49.54	98	3.837	189	50.98	159
19.9	32.854	304	11.52	152	60.66	70	42.42	255	14.501	220	48.56	71	4.026	218	49.39	127
r. 1.9	33.158	330	10.00	146	61.36	77	39.87	228	14.721	241	47.85	41	4.244	243	48.12	89
11.9	33.488	353	8.54	138	62.13	83	37.59	195	14.962	262	47.44	6	4.487	265	47.23	47
21.8	33.841	372	7.16	127	62.96	87	35.64	159	15.224	277	47.38	29	4.752	282	46.76	1
31.8	34.213	386	5.89	114	63.83	90	34.05	121	15.501	290	47.67	64	5.034	296	46.75	45
r. 10.8	34.599	395	4.75	100	64.73	93	32.84	80	15.791	297	48.31	97	5.330	306	47.20	90
20.7	34.994	398	3.75	83	65.66	92	32.04	38	16.088	300	49.28	129	5.636	307	48.10	131
30.7	35.392	394	2.92	62	66.58	90	31.66	4	16.388	298	50.57	155	5.943	304	49.41	169
y 10.7	35.786	384	2.30	42	67.48	87	31.70	47	16.686	288	52.12	175	6.247	294	51.10	201
20.7	36.170	365	1.88	18	68.35	81	32.17	87	16.974	274	53.87	190	6.541	278	53.11	225
30.6	36.535	336	1.70	5	69.16	72	33.04	128	17.248	252	55.77	201	6.819	254	55.36	244
ne 9.6	36.871	302	1.75	30	69.88	65	34.32	163	17.500	224	57.78	204	7.073	224	57.80	256
19.6	37.173	260	2.05	51	70.53	54	35.95	193	17.724	193	59.82	202	7.297	191	60.36	260
29.6	37.433	211	2.56	74	71.07	42	37.88	220	17.917	154	61.84	196	7.488	151	62.96	258
ly 9.5	37.644	157	3.30	90	71.49	28	40.08	238	18.071	112	63.80	185	7.639	107	65.54	251
19.5	37.801	100	4.20	105	71.77	15	42.46	249	18.183	69	65.65	169	7.746	62	68.05	237
29.5	37.901	39	5.25	116	71.92	1	44.95	251	18.252	24	67.34	153	7.808	16	70.42	219
ug. 8.4	37.940	20	6.41	120	71.93	15	47.46	246	18.276	19	68.87	133	7.824	28	72.61	198
18.4	37.920	74	7.61	118	71.78	26	49.92	231	18.257	60	70.20	110	7.796	71	74.59	172
28.4	37.846	125	8.79	113	71.52	39	52.23	206	18.197	95	71.30	89	7.725	108	76.31	145
pt. 7.4	37.721	167	9.92	102	71.13	50	54.29	173	18.102	127	72.19	65	7.617	139	77.76	114
17.3	37.554	199	10.94	85	70.63	58	56.02	133	17.975	149	72.84	44	7.478	163	78.90	83
27.3	37.355	221	11.79	61	70.05	64	57.35	87	17.826	164	73.28	19	7.315	178	79.73	51
ct. 7.3	37.134	228	12.40	37	69.41	67	58.22	35	17.662	168	73.47	2	7.137	184	80.24	16
17.3	36.906	223	12.77	9	68.74	66	58.57	19	17.494	164	73.45	26	6.953	181	80.40	17
27.2	36.683	206	12.86	19	68.08	62	58.38	72	17.330	151	73.19	47	6.772	168	80.23	50
ov. 6.2	36.477	177	12.67	46	67.46	57	57.66	125	17.179	131	72.72	68	6.604	150	79.73	83
16.2	36.300	140	12.21	73	66.89	48	56.41	174	17.048	103	72.04	88	6.454	122	78.90	115
26.1	36.160	92	11.48	96	66.41	38	54.67	217	16.945	70	71.16	106	6.332	90	77.75	143
ec. 6.1	36.068	42	10.52	117	66.03	25	52.50	253	16.875	34	70.10	123	6.242	54	76.32	168
16.1	36.026	9	9.35	131	65.78	11	49.97	279	16.841	2	68.87	133	6.188	16	74.64	188
26.1	36.035	63	8.04	143	65.67	2	47.18	298	16.843	40	67.54	141	6.172	23	72.76	202
36.0	36.098		6.61		65.69		44.20		16.883		66.13		6.195		70.74	
...n Place	32.212		14.69		60.707		51.67		14.175		55.08		3.931		57.45	
δ, Tan δ	1.348		−0.903		3.446		−3.298		1.006		+0.109		1.059		+0.350	
a, Dω a	+0.08		+0.03		+0.14		+0.10		+0.06		0.00		+0.05		−0.01	
δ, Dω δ	+0.2		−0.9		+0.2		−0.9		+0.2		−0.9		+0.2		−0.9	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ζ Sagittarii. Mag. 4.6 Right Ascension.		ζ Sagittarii. Declination.		τ Aquilæ. Mag. 5.6 Right Ascension.		τ Aquilæ. Declination.		θ Aquilæ. Mag. 3.4 Right Ascension.		θ Aquilæ. Declination.		o Cygni. Mag. 4 Right Ascension.	
	h m		° ′		h m		° ′		h m		° ′		h m	
	19 57		−27 56		20 0		+ 7 2		20 7		− 1 3		20 10	
	s		″		s		″		s		″		s	
Jan. 1.1	33.222		33.32		4.806		35.65		1.133		67.00		59.832	
11.0	33.305	83	32.68	64	4.864	58	34.22	143	1.190	57	67.96	96	59.813	19
21.0	33.428	123	31.95	73	4.956	92	32.80	142	1.282	92	68.90	94	59.848	35
31.0	33.588	160	31.18	77	5.083	127	31.45	135	1.407	125	69.76	86	59.937	89
Feb. 10.0	33.780	192	30.35	83	5.241	158	30.26	119	1.563	156	70.48	72	60.080	143
19.9	34.005	225	29.45	90	5.427	186	29.26	100	1.746	183	71.03	55	60.272	192
Mar. 1.9	34.257	252	28.50	95	5.640	213	28.54	72	1.956	210	71.36	33	60.510	238
11.9	34.532	275	27.49	101	5.875	235	28.11	43	2.189	233	71.44	8	60.790	280
21.8	34.829	297	26.43	106	6.132	257	28.03	8	2.443	254	71.23	21	61.107	317
31.8	35.143	314	25.34	109	6.406	274	28.31	28	2.715	272	70.74	49	61.453	346
Apr. 10.8	35.470	327	24.23	111	6.693	287	28.95	64	3.001	286	69.96	78	61.819	366
20.8	35.807	337	23.12	111	6.989	296	29.92	97	3.298	297	68.92	104	62.198	379
30.7	36.149	342	22.05	107	7.290	301	31.22	130	3.600	302	67.63	129	62.582	384
May 10.7	36.490	341	21.05	100	7.589	299	32.79	157	3.903	303	66.15	148	62.960	378
20.7	36.823	333	20.14	91	7.880	291	34.57	178	4.200	297	64.51	164	63.324	364
30.7	37.142	319	19.36	78	8.158	278	36.52	195	4.485	285	62.77	174	63.662	338
June 9.6	37.439	297	18.71	65	8.415	257	38.57	205	4.750	265	60.99	178	63.967	305
19.6	37.707	268	18.24	47	8.647	232	40.67	210	4.991	241	59.21	178	64.232	265
29.6	37.942	235	17.96	28	8.845	198	42.77	210	5.200	209	57.48	173	64.450	218
July 9.5	38.135	193	17.86	10	9.006	161	44.80	203	5.372	172	55.86	162	64.615	165
19.5	38.282	147	17.93	7	9.127	121	46.73	193	5.504	132	54.34	152	64.723	108
29.5	38.380	98	18.17	24	9.204	77	48.52	179	5.593	89	52.98	136	64.773	50
Aug. 8.5	38.427	47	18.54	37	9.236	32	50.12	160	5.637	44	51.81	117	64.764	9
18.4	38.423	4	19.02	48	9.224	12	51.54	142	5.637	0	50.81	100	64.698	66
28.4	38.372	51	19.58	56	9.171	53	52.73	119	5.594	43	50.00	81	64.578	120
Sept. 7.4	38.279	93	20.17	59	9.082	89	53.69	96	5.514	80	49.39	61	64.409	169
17.4	38.148	131	20.76	59	8.960	122	54.41	72	5.401	113	48.96	43	64.199	210
27.3	37.989	159	21.31	55	8.815	145	54.91	50	5.264	137	48.72	24	63.957	242
Oct. 7.3	37.813	176	21.78	47	8.654	161	55.16	25	5.110	154	48.64	8	63.690	267
17.3	37.628	185	22.14	36	8.487	167	55.18	2	4.949	161	48.72	8	63.410	280
27.2	37.446	182	22.36	22	8.323	164	54.97	21	4.789	160	48.96	24	63.128	282
Nov. 6.2	37.280	166	22.46	10	8.169	154	54.54	43	4.640	149	49.33	37	62.854	274
16.2	37.135	145	22.42	4	8.035	134	53.88	66	4.509	131	49.84	51	62.599	255
26.2	37.023	112	22.23	19	7.928	107	53.02	86	4.405	104	50.49	65	62.370	229
Dec. 6.1	36.947	76	21.91	32	7.852	76	51.98	104	4.331	74	51.25	76	62.177	193
16.1	36.913	34	21.49	42	7.809	43	50.77	121	4.289	42	52.10	85	62.025	152
26.1	36.923	10	20.98	51	7.803	6	49.44	133	4.285	4	53.02	92	61.921	104
36.1	36.976	53	20.38	60	7.835	32	48.03	141	4.317	32	53.99	97	61.868	53
Mean Place	33.406		29.64		5.136		35.37		1.371		66.48		61.132	
Sec δ, Tan δ	1.132		−0.530		1.008		+0.124		1.000		−0.019		1.452	
Dψ α, Dω α	+0.07		+0.02		+0.06		0.00		+0.06		0.00		+0.04	
Dψ δ, Dω δ	+0.2		−0.9		+0.2		−0.9		+0.2		−0.9		+0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

β Capricorni. Mag 3.2			
Right Ascension.		Declination.	
h m		° ′	
20 16		−15 2	
s		″	
20.858		41.69	
20.914	56	41.81	12
21.006	92	41.86	5
21.132	126	41.83	3
21.290	158	41.70	13
21.477	187	41.42	28
21.691	214	41.02	40
21.928	237	40.45	57
22.188	260	39.70	75
22.467	279	38.80	90
22.763	296	37.75	105
23.069	306	36.56	119
23.384	315	35.29	127
23.700	316	33.94	135
24.013	313	32.59	135
24.315	302	31.23	136
24.600	285	29.95	128
24.859	259	28.77	118
25.089	230	27.71	106
25.284	195	26.79	92
25.435	151	26.05	74
25.541	106	25.48	57
25.602	61	25.08	40
25.616	14	24.85	23
25.584	32	24.76	9
25.513	71	24.81	5
25.405	108	24.95	14
25.272	133	25.18	23
25.119	153	25.45	27
24.956	163	25.75	30
24.793	163	26.06	31
24.640	153	26.36	30
24.504	136	26.65	29
24.395	109	26.92	27
24.316	79	27.17	25
24.271	45	27.39	22
24.264	7	27.58	19
24.295	31	27.73	15
21.000		39.49	
1.035		−0.269	
+0.07		+0.01	
+0.2		−0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	α Pavonis. Mag. 2.1 Right Ascension.		α Pavonis. Declination.		γ Cygni. Mag. 2.3 Right Ascension.		γ Cygni. Declination.		π Capricorni. Mag. 5.2 Right Ascension.		π Capricorni. Declination.		ρ Capri[corni.] Mag. Right Ascension.	
	h m 20 19		° ′ −56 59		h m 20 19		° ′ +39 59		h m 20 22		° ′ −18 28		h m 20 24	
	s		″		s		″		s		″		s	
Jan. 1.1	4.805		74.37		13.961		31.33		34.193		66.92		7.574	
11.0	4.858	53	72.05	232	13.951	10	28.62	271	34.244	51	66.82	10	7.623	49
21.0	4.978	120	69.61	244	13.988	37	25.81	281	34.332	88	66.65	17	7.709	86
31.0	5.163	185	67.11	250	14.072	84	22.99	282	34.455	123	66.38	27	7.830	121
Feb. 10.0	5.407	244	64.60	251	14.203	131	20.29	270	34.610	155	66.01	37	7.982	152
19.9	5.707	300	62.14	246	14.377	174	17.83	246	34.793	183	65.53	48	8.164	182
Mar. 1.9	6.056	349	59.77	237	14.593	216	15.71	212	35.006	213	64.91	62	8.374	210
11.9	6.449	393	57.54	223	14.846	253	14.01	170	35.243	237	64.15	76	8.609	235
21.9	6.881	432	55.50	204	15.132	286	12.81	120	35.504	261	63.26	89	8.868	259
31.8	7.344	463	53.66	184	15.447	315	12.16	65	35.785	281	62.23	103	9.147	279
Apr. 10.8	7.834	490	52.07	159	15.782	335	12.08	8	36.083	298	61.08	115	9.443	296
20.8	8.341	507	50.76	131	16.132	350	12.59	51	36.394	311	59.84	124	9.754	311
30.7	8.858	517	49.75	101	16.487	355	13.64	105	36.714	320	58.53	131	10.072	318
May 10.7	9.377	519	49.07	68	16.840	353	15.22	158	37.036	322	57.20	133	10.394	322
20.7	9.886	509	48.74	33	17.183	343	17.27	205	37.356	320	55.88	132	10.713	319
30.7	10.375	489	48.76	2	17.507	324	19.73	246	37.665	309	54.60	128	11.022	309
June 9.6	10.833	458	49.14	38	17.803	296	22.51	278	37.958	293	53.42	118	11.316	294
19.6	11.249	416	49.86	72	18.064	261	25.55	304	38.227	269	52.36	106	11.585	269
29.6	11.614	365	50.90	104	18.284	220	28.75	320	38.466	239	51.44	92	11.824	239
July 9.6	11.918	304	52.22	132	18.457	173	32.04	329	38.668	202	50.70	74	12.026	202
19.5	12.152	234	53.80	158	18.580	123	35.34	330	38.828	160	50.13	57	12.187	161
29.5	12.311	159	55.56	176	18.649	69	38.57	323	38.943	115	49.75	38	12.304	117
Aug. 8.5	12.391	80	57.45	189	18.664	15	41.66	309	39.011	68	49.55	20	12.373	69
18.4	12.391	0	59.40	195	18.626	38	44.56	290	39.031	20	49.50	5	12.394	21
28.4	12.315	76	61.33	193	18.538	88	47.19	263	39.006	25	49.60	10	12.370	24
Sept. 7.4	12.167	148	63.16	183	18.404	134	49.53	234	38.939	67	49.82	22	12.304	66
17.4	11.957	210	64.81	165	18.231	173	51.51	198	38.835	104	50.12	30	12.202	102
27.3	11.695	262	66.22	141	18.027	204	53.10	159	38.702	133	50.47	35	12.070	132
Oct. 7.3	11.395	300	67.30	108	17.802	225	54.26	116	38.549	153	50.85	38	11.918	152
17.3	11.074	321	68.01	71	17.563	239	54.98	72	38.384	165	51.22	37	11.753	165
27.3	10.748	326	68.31	30	17.321	242	55.23	25	38.219	165	51.57	35	11.589	164
Nov. 6.2	10.434	314	68.19	12	17.085	236	55.00	23	38.062	157	51.87	30	11.432	157
16.2	10.147	287	67.63	56	16.866	219	54.29	71	37.922	140	52.11	24	11.292	140
26.2	9.902	245	66.67	96	16.670	196	53.12	117	37.808	114	52.31	20	11.177	115
Dec. 6.1	9.708	194	65.31	136	16.506	164	51.50	162	37.724	84	52.44	13	11.092	85
16.1	9.577	131	63.61	170	16.379	127	49.48	202	37.673	51	52.52	8	11.041	51
26.1	9.511	66	61.64	197	16.294	85	47.14	234	37.661	12	52.53	1	11.027	14
36.1	9.516	5	59.43	221	16.253	41	44.53	261	37.686	25	52.48	5	11.051	24
Mean Place	5.338		67.87		14.948		25.47		34.314		64.20		7.690	
Sec δ, Tan δ	1.836		−1.540		1.305		+0.839		1.054		−0.334		1.052	
$D_\psi \alpha$, $D_\omega \alpha$	+0.09		+0.06		+0.04		−0.03		+0.07		+0.01		+0.07	
$D_\psi \delta$, $D_\omega \delta$	+0.2		−0.8		+0.2		−0.8		+0.2		−0.8		+0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

...ington ...Time.	41 Cygni. Mag. 4.1 Right Ascension.		Declination.		θ Cephei. Mag. 4.3 Right Ascension.		Declination.		ε Delphini. Mag. 4.0 Right Ascension.		Declination.		Groombridge 3241. Mag. 6.4 Right Ascension.		Declination.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	20 25		+30 5		20 28		+62 42		20 29		+11 1		20 30		+72 14	
	s		″		s		″		s		″		s		″	
...ı. 1.1	59.639		32.45		9.00		62.60		14.572		15.52		18.15		72.41	
11.0	59.644	5	30.09	236	8.87	13	59.57	303	14.599	27	13.99	153	17.89	26	69.42	299
21.0	59.687	43	27.65	244	8.82	5	56.36	321	14.660	61	12.43	156	17.74	15	66.21	321
31.0	59.772	85	25.22	243	8.85	3	53.08	328	14.754	94	10.93	150	17.73	1	62.90	331
...b. 10.0	59.896	124	22.91	231	8.97	12	49.86	322	14.882	128	9.56	137	17.86	13	59.62	328
19.9	60.058	162	20.82	209	9.18	21	46.83	303	15.040	158	8.39	117	18.12	26	56.50	312
...r. 1.9	60.255	197	19.04	178	9.47	29	44.11	272	15.227	187	7.47	92	18.50	38	53.65	285
11.9	60.484	229	17.66	138	9.82	35	41.81	230	15.442	215	6.87	60	18.99	49	51.21	244
21.9	60.744	260	16.73	93	10.24	42	40.01	180	15.681	239	6.63	24	19.57	58	49.26	195
31.8	61.027	283	16.29	44	10.71	47	38.79	122	15.943	262	6.77	14	20.23	66	47.89	137
...r. 10.8	61.332	305	16.37	8	11.21	50	38.19	60	16.222	279	7.29	52	20.95	72	47.12	77
20.8	61.650	318	16.98	61	11.73	52	38.25	6	16.516	294	8.19	90	21.70	75	46.99	13
30.7	61.977	327	18.09	111	12.26	53	38.93	68	16.819	303	9.45	126	22.46	76	47.52	53
...y 10.7	62.304	327	19.66	157	12.79	53	40.22	129	17.125	306	11.02	157	23.21	75	48.65	113
20.7	62.625	321	21.64	198	13.30	51	42.08	186	17.426	301	12.84	182	23.92	71	50.36	171
30.7	62.931	306	23.97	233	13.77	47	44.43	235	17.719	293	14.89	205	24.57	65	52.59	223
...ne 9.6	63.216	285	26.59	262	14.19	42	47.22	279	17.994	275	17.08	219	25.15	58	55.28	269
19.6	63.471	255	29.41	282	14.54	35	50.37	315	18.244	250	19.35	227	25.64	49	58.34	306
29.6	63.690	219	32.36	295	14.84	30	53.77	340	18.465	221	21.66	231	26.02	38	61.69	335
...ly 9.6	63.869	179	35.36	300	15.05	21	57.36	359	18.651	186	23.93	227	26.28	26	65.25	356
19.5	64.003	134	38.36	300	15.19	14	61.03	367	18.796	145	26.11	218	26.44	16	68.93	368
29.5	64.089	86	41.27	291	15.24	5	64.71	368	18.897	101	28.16	205	26.46	2	72.64	371
...ıg. 8.5	64.126	37	44.04	277	15.21	3	68.32	361	18.954	57	30.06	190	26.37	9	76.31	367
18.4	64.115	11	46.60	256	15.10	11	71.77	345	18.966	12	31.75	169	26.16	21	79.84	353
28.4	64.057	58	48.92	232	14.90	20	75.01	324	18.935	31	33.22	147	25.84	32	83.18	334
...pt. 7.4	63.956	101	50.95	203	14.63	27	77.95	294	18.864	71	34.44	122	25.41	43	86.25	307
17.4	63.821	135	52.65	170	14.31	32	80.54	259	18.759	105	35.42	98	24.89	52	88.98	273
27.3	63.656	165	54.01	136	13.94	37	82.73	219	18.628	131	36.13	71	24.29	60	91.35	237
...ct. 7.3	63.469	187	54.99	98	13.52	42	84.46	173	18.477	151	36.59	46	23.64	65	93.25	190
17.3	63.271	198	55.57	58	13.08	44	85.70	124	18.316	161	36.78	19	22.94	70	94.65	140
27.3	63.069	202	55.74	17	12.62	46	86.40	70	18.152	161	36.71	7	22.22	72	95.53	88
...ov. 6.2	62.872	197	55.49	25	12.17	45	86.55	15	17.994	158	36.37	34	21.50	72	95.85	32
16.2	62.690	182	54.83	66	11.73	44	86.14	41	17.850	144	35.79	58	20.79	71	95.59	26
26.2	62.531	159	53.77	106	11.32	41	85.14	100	17.728	122	34.96	83	20.11	68	94.75	84
...ec. 6.1	62.400	131	52.34	143	10.95	37	83.61	153	17.632	96	33.91	105	19.49	62	93.34	141
16.1	62.300	100	50.56	178	10.63	32	81.58	203	17.566	66	32.66	125	18.96	53	91.41	193
26.1	62.238	62	48.49	207	10.38	25	79.09	249	17.534	32	31.27	139	18.51	45	89.01	240
36.1	62.215	23	46.21	228	10.21	17	76.25	284	17.536	2	29.77	150	18.17	34	86.22	279
...n Place	60.298		27.48		11.516		53.24		14.877		13.40		22.523		62.00	
...δ, Tan δ	1.156		+0.579		2.181		+1.939		1.019		+0.195		3.280		+3.124	
..., D_∞ α	+0.05		−0.02		+0.02		−0.08		+0.06		−0.01		0.00		−0.13	
..., D_∞ δ	+0.2		−0.8		+0.2		−0.8		+0.2		−0.8		+0.2		−0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	α Indi. Mag. 3.2				β Delphini. Mag. 3.7				υ Capricorni. Mag. 5.3				α Delphini. Mag. 3	
	Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.	
	h m		° ′		h m		° ′		h m		° ′		h m	
	20 31		−47 34		20 33		+14 18		20 35		−18 25		20 35	
	s		″		s		″		s		″		s	
Jan. 1.1	43.698		61.44		39.118		23.33		19.518		56.01		46.640	
		39		181		20		169		39		10		17
11.1	43.737		59.63		39.138		21.64		19.557		55.91		46.657	
		91		195		54		171		74		21		50
21.0	43.828		57.68		39.192		19.93		19.631		55.70		46.707	
		143		204		88		165		109		29		85
31.0	43.971		55.64		39.280		18.28		19.740		55.41		46.792	
		190		212		122		155		140		40		119
Feb. 10.0	44.161		53.52		39.402		16.73		19.880		55.01		46.911	
		233		212		153		135		171		53		151
19.9	44.394		51.40		39.555		15.38		20.051		54.48		47.062	
		274		209		183		107		200		67		181
Mar. 1.9	44.668		49.31		39.738		14.31		20.251		53.81		47.243	
		311		204		212		75		226		81		211
11.9	44.979		47.27		39.950		13.56		20.477		53.00		47.454	
		344		195		237		38		252		96		236
21.9	45.323		45.32		40.187		13.18	—	20.729		52.04		47.690	
		372		183		262		1		272		110		261
31.8	45.695		43.49		40.449		13.19		21.001		50.94		47.951	
		397		167		280		44		292		122		280
Apr. 10.8	46.092		41.82		40.729		13.63		21.293		49.72		48.231	
		415		148		296		84		309		131		295
20.8	46.507		40.34		41.025		14.47		21.602		48.41		48.526	
		427		125		304		122		318		138		306
30.8	46.934		39.09		41.329		15.69		21.920		47.03		48.832	
		432		101		308		157		323		141		310
May 10.7	47.366		38.08		41.637		17.26		22.243		45.62		49.142	
		428		72		305		185		323		140		306
20.7	47.794		37.36		41.942		19.11		22.566		44.22		49.448	
		416		44		295		210		315		134		296
30.7	48.210		36.92		42.237		21.21		22.881		42.88		49.744	
		394		12		278		226		299		126		280
June 9.6	48.604		36.80	—	42.515		23.47		23.180		41.62		50.024	
		363		19		254		239		278		112		256
19.6	48.967		36.99		42.769		25.86		23.458		40.50		50.280	
		322		49		225		243		247		98		225
29.6	49.289		37.48		42.994		28.29		23.705		39.52		50.505	
		274		79		188		242		212		80		190
July 9.6	49.563		38.27		43.182		30.71		23.917		38.72		50.695	
		219		103		147		235		172		60		149
19.5	49.782		39.30		43.329		33.06		24.089		38.12		50.844	
		158		126		104		223		127		43		105
29.5	49.940		40.56		43.433		35.29		24.216		37.69		50.949	
		92		143		59		206		80		22		60
Aug. 8.5	50.032		41.99		43.492		37.35		24.296		37.47		51.009	
		28		152		14		188		32		6		15
18.5	50.060	—	43.51		43.506	—	39.23		24.328	—	37.41	—	51.024	—
		36		157		30		164		15		9		29
28.4	50.024		45.08		43.476		40.87		24.313		37.50		50.995	
		97		155		70		140		57		24		69
Sept. 7.4	49.927		46.63		43.406		42.27		24.256		37.74		50.926	
		149		146		103		113		94		32		104
17.4	49.778		48.09		43.303		43.40		24.162		38.06		50.822	
		192		129		131		86		126		38		132
27.3	49.586		49.38		43.172		44.26		24.036		38.44		50.690	
		225		107		152		56		147		41		152
Oct. 7.3	49.361		50.45		43.020		44.82		23.889		38.85		50.538	
		244		79		165		27		160		42		166
17.3	49.117		51.24		42.855		45.09		23.729		39.27		50.372	
		251		47		166		0		163		40		168
27.3	48.866		51.71		42.689		45.09		23.566		39.67		50.204	
		244		12		161		30		158		35		162
Nov. 6.2	48.622		51.83		42.528		44.79		23.408		40.02		50.042	
		223		23		148		59		143		29		150
16.2	48.399		51.60		42.380		44.20		23.265		40.31		49.892	
		193		58		127		85		120		22		131
26.2	48.206		51.02		42.253		43.35		23.145		40.53		49.761	
		151		90		103		110		91		17		105
Dec. 6.2	48.055		50.12		42.150		42.25		23.054		40.70		49.656	
		104		122		72		132		58		9		75
16.1	47.951		48.90		42.078		40.93		22.996		40.79		49.581	
		53		147		39		151		23		3		43
26.1	47.898	—	47.43		42.039		39.42		22.973	—	40.82	—	49.538	
		1		169		6		163		11		5		8
36.1	47.899		45.74		42.033		37.79		22.984		40.77		49.530	
Mean Place	43.960		55.24		39.453		20.44		19.605		53.45		46.988	
Sec δ, Tan δ	1.482		−1.094		1.032		+0.255		1.054		−0.333		1.038	
$D_\psi a$, $D_\omega a$	+0.08		+0.04		+0.06		−0.01		+0.07		+0.01		+0.06	
$D_\psi \delta$, $D_\omega \delta$	+0.2		−0.8		+0.2		−0.8		+0.2		−0.8		+0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

...ngton ...Time.	β Pavonis. Mag. 3.6 Right Ascension.		β Pavonis. Declination.		α Cygni. (Deneb.) Mag. 1.3 Right Ascension.		α Cygni. Declination.		δ Delphini. Mag. 4.5 Right Ascension.		δ Delphini. Declination.		ψ Capricorni. Mag. 4.3 Right Ascension.		ψ Capricorni. Declination.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	20 37		−66 29		20 38		+44 58		20 39		+14 46		20 41		−25 33	
	s		″		s		″		s		″		s		″	
1.1	28.78	1	77.64	274	35.010	47	67.56	272	34.722	14	36.81	168	10.984	34	74.82	53
11.1	28.77	8	74.90	291	34.963	3	64.84	287	34.736	47	35.16	171	11.018	72	74.29	64
21.0	28.85	17	71.99	299	34.966	54	61.97	292	34.783	82	33.45	167	11.090	107	73.65	76
31.0	29.02	26	69.00	301	35.020	104	59.05	285	34.865	116	31.78	156	11.197	141	72.89	85
10.0	29.28	34	65.99	297	35.124	155	56.20	265	34.981	147	30.22	136	11.338	173	72.04	97
19.9	29.62	42	63.02	285	35.279	203	53.55	237	35.128	178	28.86	110	11.511	204	71.07	107
1.9	30.04	48	60.17	267	35.482	247	51.18	195	35.306	207	27.76	77	11.715	232	70.00	118
11.9	30.52	54	57.50	246	35.729	287	49.23	147	35.513	233	26.99	40	11.947	258	68.82	127
21.9	31.06	58	55.04	219	36.016	320	47.76	92	35.746	258	26.59	2	12.205	282	67.55	134
31.8	31.64	62	52.85	189	36.336	349	46.84	35	36.004	277	26.57	40	12.487	303	66.21	141
10.8	32.26	66	50.96	154	36.685	367	46.49	24	36.281	293	26.97	81	12.790	319	64.80	141
20.8	32.92	67	49.42	116	37.052	378	46.73	82	36.574	305	27.78	120	13.109	331	63.39	142
30.8	33.59	68	48.26	77	37.430	379	47.55	138	36.879	308	28.98	154	13.440	337	61.97	138
10.7	34.27	67	47.49	35	37.809	372	48.93	189	37.187	305	30.52	185	13.777	337	60.59	129
20.7	34.94	65	47.14	8	38.181	353	50.82	234	37.492	298	32.37	209	14.114	331	59.30	117
30.7	35.59	61	47.22	48	38.534	328	53.16	272	37.790	282	34.46	228	14.445	315	58.13	104
e 9.6	36.20	56	47.70	89	38.862	291	55.88	302	38.072	257	36.74	238	14.760	293	57.09	85
19.6	36.76	50	48.59	128	39.153	249	58.90	323	38.329	230	39.12	246	15.053	264	56.24	64
29.6	37.26	40	49.87	161	39.402	201	62.13	337	38.559	192	41.58	245	15.317	227	55.60	44
y 9.6	37.66	33	51.48	190	39.603	147	65.50	343	38.751	153	44.03	237	15.544	186	55.16	22
19.5	37.99	23	53.38	213	39.750	89	68.93	341	38.904	110	46.40	227	15.730	139	54.94	1
29.5	38.22	13	55.51	227	39.839	33	72.34	331	39.014	64	48.67	210	15.869	89	54.93	19
g. 8.5	38.35	1	57.78	235	39.872	23	75.65	313	39.078	19	50.77	192	15.958	40	55.12	35
18.5	38.36	9	60.13	233	39.849	70	78.78	292	39.097	25	52.69	168	15.998	9	55.47	50
28.4	38.27	18	62.46	222	39.770	129	81.70	262	39.072	65	54.37	145	15.989	56	55.97	59
pt. 7.4	38.09	27	64.68	202	39.641	172	84.32	228	39.007	99	55.82	116	15.933	94	56.56	65
17.4	37.82	35	66.70	174	39.469	209	86.60	191	38.908	129	56.98	90	15.839	129	57.21	66
27.3	37.47	41	68.44	138	39.260	236	88.51	148	38.779	149	57.88	60	15.710	152	57.87	64
t. 7.3	37.06	45	69.82	95	39.024	254	89.99	103	38.630	163	58.48	31	15.558	170	58.51	57
17.3	36.61	47	70.77	48	38.770	262	91.02	54	38.467	166	58.79	3	15.388	173	59.08	49
27.3	36.14	46	71.25	4	38.508	259	91.56	4	38.301	161	58.82	27	15.215	167	59.57	37
v. 6.2	35.68	44	71.21	55	38.249	249	91.60	46	38.140	150	58.55	56	15.048	154	59.94	21
16.2	35.24	39	70.66	105	38.000	228	91.14	97	37.990	131	57.99	83	14.894	131	60.15	9
26.2	34.85	33	69.61	151	37.772	199	90.17	145	37.859	105	57.16	108	14.763	102	60.24	5
c. 6.2	34.52	25	68.10	194	37.573	164	88.72	188	37.754	76	56.08	131	14.661	67	60.19	21
16.1	34.27	16	66.16	229	37.409	124	86.84	227	37.678	45	54.77	149	14.594	32	59.98	32
26.1	34.11	8	63.87	250	37.285	78	84.57	259	37.633	10	53.28	163	14.562	7	59.66	45
36.1	34.03		61.28		37.207		81.98		37.623		51.65		14.569		59.21	
. Place	29.681		69.90		36.119		59.39		35.044		33.59		11.051		71.19	
, Tan δ	2.508		−2.300		1.414		+1.000		1.034		+0.264		1.109		−0.478	
D α	+0.11		+0.10		+0.04		−0.04		+0.06		−0.01		+0.07		+0.02	
D δ	+0.3		−0.8		+0.3		−0.8		+0.3		−0.8		+0.3		−0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	γ Delphini *seq.* Mag. 4.5 Right Ascension.		γ Delphini *seq.* Declination.		ε Cygni. Mag. 2.6 Right Ascension.		ε Cygni. Declination.		ε Aquarii. Mag. 3.8 Right Ascension.		ε Aquarii. Declination.		η Ce[…] Mag. […] Right Ascension.	
	h m 20 42		° ′ +15 49		h m 20 42		° ′ +33 39		h m 20 43		° ′ − 9 47		h m 20 43	
	s		″		s		″		s		″		s	
Jan. 1.1	48.119	10	31.79	172	50.479	19	38.22	238	10.963	29	62.21	39	33.96	14
11.1	48.129	43	30.07	176	50.460	22	35.84	251	10.992	62	62.60	32	33.82	7
21.0	48.172	78	28.31	172	50.482	63	33.33	252	11.054	93	62.92	23	33.75	1
31.0	48.250	112	26.59	160	50.545	105	30.81	244	11.147	126	63.15	11	33.76	9
Feb. 10.0	48.362	143	24.99	143	50.650	145	28.37	225	11.273	156	63.26	4	33.85	17
19.9	48.505	176	23.56	115	50.795	183	26.12	195	11.429	183	63.22	23	34.02	24
Mar. 1.9	48.681	205	22.41	83	50.978	220	24.17	157	11.612	211	62.99	41	34.26	33
11.9	48.886	231	21.58	47	51.198	254	22.60	113	11.823	235	62.58	64	34.59	38
21.9	49.117	257	21.11	5	51.452	282	21.47	63	12.058	259	61.94	84	34.97	44
31.8	49.374	277	21.06	36	51.734	307	20.84	10	12.317	278	61.10	105	35.41	48
Apr. 10.8	49.651	293	21.42	78	52.041	325	20.74	44	12.595	294	60.05	124	35.89	50
20.8	49.944	305	22.20	118	52.366	336	21.18	97	12.889	307	58.81	139	36.39	52
30.8	50.249	310	23.38	153	52.702	340	22.15	145	13.196	312	57.42	150	36.91	52
May 10.7	50.559	308	24.91	183	53.042	336	23.60	190	13.508	313	55.92	158	37.43	50
20.7	50.867	298	26.74	210	53.378	324	25.50	229	13.821	305	54.34	161	37.93	47
30.7	51.165	284	28.84	229	53.702	302	27.79	261	14.126	292	52.73	159	38.40	43
June 9.6	51.449	260	31.13	242	54.004	275	30.40	284	14.418	271	51.14	153	38.83	38
19.6	51.709	232	33.55	248	54.279	239	33.24	303	14.689	243	49.61	142	39.21	31
29.6	51.941	195	36.03	248	54.518	198	36.27	311	14.932	210	48.19	129	39.52	24
July 9.6	52.136	155	38.51	243	54.716	153	39.38	313	15.142	170	46.90	112	39.76	17
19.5	52.291	112	40.94	233	54.869	104	42.51	307	15.312	128	45.78	94	39.93	9
29.5	52.403	67	43.27	217	54.973	53	45.58	296	15.440	82	44.84	75	40.02	0
Aug. 8.5	52.470	22	45.44	197	55.026	3	48.54	279	15.522	37	44.09	57	40.02	7
18.5	52.492	22	47.41	174	55.029	46	51.33	255	15.559	8	43.52	38	39.95	16
28.4	52.470	63	49.15	150	54.983	90	53.88	228	15.551	49	43.14	21	39.79	22
Sept. 7.4	52.407	98	50.65	122	54.893	129	56.16	195	15.502	86	42.93	6	39.57	28
17.4	52.309	128	51.87	94	54.764	161	58.11	160	15.416	116	42.87	7	39.29	33
27.3	52.181	149	52.81	65	54.603	185	59.71	122	15.300	137	42.94	17	38.96	38
Oct. 7.3	52.032	163	53.46	35	54.418	201	60.93	81	15.163	151	43.11	27	38.58	41
17.3	51.869	167	53.81	5	54.217	207	61.74	39	15.012	155	43.38	32	38.17	42
27.3	51.702	162	53.86	25	54.010	204	62.13	5	14.857	150	43.70	38	37.75	43
Nov. 6.2	51.540	151	53.61	54	53.806	194	62.08	48	14.707	138	44.08	41	37.32	42
16.2	51.389	133	53.07	83	53.612	175	61.60	92	14.569	117	44.49	43	36.90	39
26.2	51.256	108	52.24	110	53.437	150	60.68	133	14.452	93	44.92	45	36.51	36
Dec. 6.2	51.148	80	51.14	132	53.287	118	59.35	170	14.359	61	45.37	46	36.15	31
16.1	51.068	49	49.82	152	53.169	84	57.65	203	14.298	29	45.83	45	35.84	26
26.1	51.019	14	48.30	167	53.085	46	55.62	228	14.269	3	46.28	42	35.58	19
36.1	51.005		46.63		53.039		53.34		14.272		46.70		35.39	
Mean Place	48.447		28.19		51.169		31.48		11.054		61.17		36.226	
Sec δ, Tan δ	1.039		+0.283		1.201		+0.666		1.015		−0.173		2.097	
$D_\psi \alpha$, $D_\omega \alpha$	+0.06		−0.01		+0.05		−0.03		+0.06		+0.01		+0.02	
$D_\psi \delta$, $D_\omega \delta$	+0.3		−0.8		+0.3		−0.8		+0.3		−0.8		+0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

ton me.	μ Aquarii. Mag. 4.8				β Indi. Mag. 3.7				32 Vulpeculæ. Mag. 5.2				220 H¹. Draconis. Mag. 5.6			
	Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	20 48		− 9 17		20 48		−58 45		20 51		+27 44		20 51		+80 14	
	s		″		s		″		s		″		s		″	
1.1	10.627		45.05		19.513		72.65		0.827		35.18		15.39		43.46	
11.1	10.652	25	45.46	41	19.507	6	70.30	235	0.811	16	33.01	217	14.72	67	40.73	273
21.0	10.709	57	45.80	34	19.569	62	67.76	254	0.833	22	30.76	225	14.27	45	37.70	303
31.0	10.797	88	46.04	24	19.698	129	65.10	266	0.893	60	28.49	227	14.06	21	34.49	321
10.0	10.918	121	46.17	13	19.893	195	62.37	273	0.989	96	26.31	218	14.09	3	31.24	325
20.0	11.069	151	46.15	2	20.147	254	59.65	272	1.123	134	24.31	200	14.38	29	28.05	319
r. 1.9	11.247	178	45.93	22	20.458	311	56.97	268	1.294	171	22.59	172	14.90	52	25.09	296
11.9	11.454	207	45.53	10	20.820	362	54.41	256	1.499	205	21.21	138	15.64	74	22.42	267
21.9	11.685	231	44.90	63	21.228	408	52.00	241	1.735	236	20.25	96	16.56	92	20.21	221
31.8	11.940	255	44.06	84	21.677	449	49.78	222	2.001	266	19.76	49	17.64	108	18.50	171
r. 10.8	12.215	275	43.01	105	22.160	483	47.81	197	2.290	289	19.78	2	18.85	121	17.37	113
20.8	12.507	292	41.77	124	22.670	510	46.10	171	2.599	309	20.28	50	20.13	128	16.88	49
30.8	12.812	305	40.37	140	23.198	528	44.71	139	2.920	321	21.27	99	21.43	130	16.97	9
y 10.7	13.123	311	38.85	152	23.735	537	43.68	103	3.246	326	22.70	143	22.73	130	17.72	75
20.7	13.435	312	37.24	161	24.271	536	43.01	67	3.571	325	24.55	185	23.97	124	19.07	135
30.7	13.741	306	35.61	163	24.794	523	42.72	29	3.887	316	26.76	221	25.12	115	20.95	188
ne 9.7	14.035	294	33.99	162	25.292	498	42.82	10	4.185	298	29.25	249	26.15	103	23.32	237
19.6	14.309	274	32.42	157	25.753	461	43.30	48	4.459	274	31.95	270	27.03	88	26.10	278
29.6	14.555	246	30.95	147	26.167	414	44.16	86	4.700	241	34.79	284	27.72	69	29.23	313
ly 9.6	14.767	212	29.62	133	26.522	355	45.36	120	4.903	203	37.71	292	28.23	51	32.63	340
19.5	14.942	175	28.46	116	26.808	286	46.85	149	5.064	161	40.63	292	28.53	30	36.21	358
29.5	15.074	132	27.47	99	27.020	212	48.61	176	5.179	115	43.49	286	28.63	10	39.89	368
g. 8.5	15.161	87	26.67	80	27.149	129	50.54	193	5.245	66	46.23	274	28.51	12	43.61	372
18.5	15.203	42	26.07	60	27.195	46	52.59	205	5.264	19	48.78	255	28.18	33	47.24	363
28.4	15.201	2	25.65	42	27.159	36	54.69	210	5.236	28	51.12	234	27.66	52	50.73	349
pt. 7.4	15.156	45	25.42	23	27.046	113	56.73	204	5.165	71	53.19	207	26.94	72	54.01	328
17.4	15.074	82	25.34	8	26.860	186	58.64	191	5.056	109	54.96	177	26.07	87	57.04	303
27.4	14.961	113	25.39	5	26.614	246	60.33	169	4.916	140	56.40	144	25.04	103	59.71	267
ct. 7.3	14.827	134	25.55	16	26.320	294	61.74	141	4.751	165	57.49	109	23.88	116	61.99	228
17.3	14.679	148	25.82	27	25.995	325	62.78	104	4.571	180	58.20	71	22.64	124	63.82	183
27.3	14.525	154	26.15	33	25.654	341	63.42	64	4.384	187	58.53	33	21.33	131	65.14	132
ov. 6.2	14.375	150	26.53	38	25.315	339	63.60	18	4.199	185	58.47	6	19.98	135	65.89	75
16.2	14.237	138	26.95	42	24.994	321	63.34	26	4.023	176	58.02	45	18.64	134	66.09	20
26.2	14.118	119	27.41	46	24.706	288	62.62	72	3.865	158	57.18	84	17.33	131	65.69	40
ec. 6.2	14.023	95	27.88	47	24.464	242	61.46	116	3.728	137	55.97	121	16.09	124	64.72	97
16.1	13.958	65	28.35	17	24.279	185	59.91	155	3.621	107	54.42	155	14.98	111	63.19	153
26.1	13.925	33	28.81	46	24.156	123	58.01	190	3.546	75	52.59	183	14.00	98	61.14	205
36.1	13.924	1	29.25	44	24.100	56	55.81	220	3.505	41	50.52	207	13.21	79	58.62	252
n Place	10.706		44.18		19.977		64.98		1.338		28.91		23.721		30.34	
δ, Tan δ	1.013		−0.164		1.929		−1.649		1.130		+0.526		5.902		+5.817	
, D₀₀ α	+0.06		+0.01		+0.09		+0.07		+0.05		−0.02		−0.05		−0.26	
, D₀₀ δ	+0.3		−0.7		+0.3		−0.7		+0.3		−0.7		+0.3		−0.7	

FOR THE UPPER TRANSIT A

Washington Mean Time.	ν Cygni. Mag. 4.0 Right Ascension.		ν Cygni. Mag. 4.0 Declination.		α Octantis. Mag. 5.2 Right Ascension.		α Octantis. Mag. 5.2 Declination.	
	h m		° ′		h m		° ′	
	20 54		+40 50		20 54		−77 20	
	s		″		s		″	
Jan. 1.1	3.822		57.96		40.26		40.25	
11.1	3.771	51	55.42	254	40.08	18	37.15	310
21.0	3.766	5	52.73	269	40.07	1	33.84	331
31.0	3.806	40	49.98	275	40.24	17	30.43	341
Feb. 10.0	3.893	87	47.28	270	40.56	32	26.98	345
20.0	4.026	133	44.75	253	41.04	48	23.58	340
Mar. 1.9	4.204	178	42.49	226	41.67	63	20.32	326
11.9	4.424	220	40.59	190	42.42	75	17.26	306
21.9	4.684	260	39.14	145	43.29	87	14.46	280
31.9	4.979	295	38.22	92	44.25	96	11.97	249
Apr. 10.8	5.302	323	37.84	38	45.30	105	9.84	213
20.8	5.647	345	38.03	19	46.40	110	8.11	173
30.8	6.005	358	38.78	75	47.54	114	6.83	128
May 10.7	6.369	364	40.07	129	48.70	116	6.00	83
20.7	6.730	361	41.86	179	49.84	114	5.65	35
30.7	7.078	348	44.08	222	50.96	112	5.78	13
June 9.7	7.405	327	46.68	260	52.02	106	6.39	61
19.6	7.701	296	49.57	289	52.98	96	7.45	106
29.6	7.960	259	52.69	312	53.84	86	8.94	149
July 9.6	8.175	215	55.95	326	54.57	73	10.82	188
19.5	8.341	166	59.27	332	55.15	58	13.02	220
29.5	8.455	114	62.58	331	55.56	41	15.47	245
Aug. 8.5	8.514	59	65.80	322	55.79	23	18.10	263
18.5	8.520	6	68.87	307	55.83	4	20.82	272
28.4	8.473	47	71.73	286	55.70	13	23.51	269
Sept. 7.4	8.377	96	74.32	259	55.38	32	26.09	258
17.4	8.238	139	76.59	227	54.88	50	28.17	218
27.4	8.063	175	78.52	193	54.25	63	30.52	205
Oct. 7.3	7.860	203	80.03	151	53.50	75	32.17	165
17.3	7.638	222	81.11	108	52.66	84	33.34	117
27.3	7.405	233	81.74	63	51.76	90	33.98	64
Nov. 6.2	7.172	233	81.90	16	50.86	90	34.07	9
16.2	6.948	224	81.57	33	49.98	88	33.54	53
26.2	6.741	207	80.76	81	49.16	82	32.41	110
Dec. 6.2	6.556	185	79.49	127	48.43	73	30.79	165
16.1	6.402	154	77.79	170	47.83	60	28.64	215
26.1	6.285	117	75.71	208	47.39	44	26.07	257
36.1	6.207	78	73.33	238	47.09	30	23.15	292
Mean Place	4.689		40.17		42.416		31.45	
Sec δ, Tan δ	1.322		+0.865		4.563		−4.452	
$D_\psi\alpha$, $D_\omega\alpha$	+0.04		−0.04		+0.15		+0.20	
$D_\psi\delta$, $D_\omega\delta$	+0.3		−0.7		+0.3		−0.7	

16.687		48.07		21.065		32.43
16.504	183	48.51	44	20.909	156	32.68
16.334	170	48.73	22	20.764	145	33.23
16.183	151	48.73	0	20.637	127	33.61
16.061	122	48.51	22	20.533	104	33.86
15.972	89	48.08	43	20.458	73	34.04
15.920	52	47.43	65	20.414	44	34.13
15.907	13	46.63	80	20.403	11	34.13
12.259		58.56		17.001		48.54
1.187		−0.639		1.049		−0.31
+0.07		+0.03		+0.07		+0.02
+0.3		−0.7		+0.3		−0.7

FOR THE UPPER TRANSIT AT WASHINGTON

hington a Time.	ξ Cygni. Mag. 3.9 Right Ascension.		Declination.		61 Cygni pr. Mag. 5.6 Right Ascension.		Declination.		ν Aquarii. Mag. 4.5 Right Ascension.		Declination.		Bradley 2777. Mag. 5.9 Right Ascension.		Declination.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	21 1		+43 35		21 3		+38 20		21 5		-11 42		21 7		+77 47	
	s		″		s		″		s		″		s		″	
. 1.1	53.744	66	56.51	253	9.717	38	34.95	232	4.434	10	31.09	24	5.06	57	38.68	262
11.1	53.678	22	53.98	272	9.679	4	32.63	249	4.444	41	31.33	18	4.49	40	36.06	296
21.0	53.656	27	51.26	280	9.683	46	30.14	255	4.485	73	31.51	7	4.09	21	33.10	317
31.0	53.683	75	48.46	277	9.729	91	27.59	250	4.558	105	31.58	6	3.88	3	29.93	326
). 10.0	53.758	124	45.69	263	9.820	135	25.09	235	4.663	134	31.52	23	3.85	18	26.67	322
20.0	53.882	172	43.06	238	9.955	178	22.74	207	4.797	164	31.29	38	4.03	37	23.45	304
r. 1.9	54.054	217	40.68	202	10.133	220	20.67	172	4.961	193	30.91	58	4.40	54	20.41	275
11.9	54.271	261	38.66	157	10.353	258	18.95	129	5.154	220	30.33	79	4.94	71	17.66	235
21.9	54.532	298	37.09	107	10.611	291	17.66	78	5.374	245	29.51	98	5.65	84	15.31	184
31.9	54.830	328	36.02	52	10.902	322	16.88	25	5.619	270	28.56	118	6.49	95	13.47	129
r. 10.8	55.158	354	35.50	7	11.224	343	16.63	30	5.889	288	27.38	134	7.44	102	12.18	68
20.8	55.512	369	35.57	63	11.567	359	16.93	85	6.177	304	26.01	149	8.46	106	11.50	4
30.8	55.881	376	36.20	118	11.926	365	17.78	138	6.481	313	24.55	158	9.52	106	11.46	57
y 10.7	56.257	374	37.38	170	12.291	364	19.16	186	6.794	318	22.97	165	10.58	104	12.03	118
20.7	56.631	303	39.08	216	12.655	352	21.02	229	7.112	314	21.32	165	11.62	98	13.21	174
30.7	56.994	340	41.24	256	13.007	334	23.31	265	7.426	302	19.67	160	12.60	90	14.95	225
ne 9.7	57.334	310	43.80	287	13.341	306	25.96	295	7.728	286	18.07	154	13.50	78	17.20	270
19.6	57.644	273	46.67	313	13.647	270	28.91	315	8.014	260	16.53	142	14.28	64	19.90	307
29.6	57.917	229	49.80	331	13.917	229	32.06	328	8.274	228	15.11	127	14.92	50	22.97	335
ly 9.6	58.146	177	53.11	337	14.146	182	35.34	335	8.502	192	13.84	108	15.42	34	26.32	357
19.6	58.323	124	56.48	339	14.328	130	38.69	333	8.694	149	12.76	89	15.76	16	29.89	370
29.5	58.447	68	59.87	332	14.458	79	42.02	324	8.843	104	11.87	69	15.92	1	33.59	375
ig. 8.5	58.515	11	63.19	319	14.537	27	45.26	309	8.947	58	11.18	49	15.93	16	37.34	371
18.5	58.526	43	66.38	298	14.564	25	48.35	288	9.005	13	10.69	28	15.77	34	41.05	360
28.4	58.483	94	69.36	274	14.539	73	51.23	262	9.018	30	10.41	12	15.43	48	44.65	341
ept. 7.4	58.389	139	72.10	242	14.466	115	53.85	231	8.988	69	10.29	4	14.95	62	48.06	316
17.4	58.250	178	74.52	206	14.351	149	56.16	195	8.919	100	10.33	17	14.33	76	51.22	284
27.4	58.072	209	76.58	166	14.202	179	58.11	157	8.819	126	10.50	28	13.57	85	54.06	245
ct. 7.3	57.863	229	78.24	123	14.023	197	59.68	115	8.693	142	10.78	35	12.72	94	56.51	201
17.3	57.634	242	79.47	77	13.826	208	60.83	71	8.551	150	11.13	39	11.78	100	58.52	152
27.3	57.392	245	80.24	29	13.618	209	61.54	25	8.401	150	11.52	43	10.78	104	60.04	97
ov. 6.3	57.147	238	80.53	22	13.409	202	61.79	21	8.251	140	11.95	44	9.74	105	61.01	40
16.2	56.909	224	80.31	71	13.207	187	61.58	67	8.111	123	12.39	43	8.69	103	61.41	19
26.2	56.685	200	79.60	119	13.020	164	60.91	112	7.988	102	12.82	42	7.66	98	61.22	78
ec. 6.2	56.485	171	78.41	164	12.856	136	59.79	153	7.886	75	13.24	39	6.68	90	60.44	137
16.1	56.314	135	76.77	204	12.720	103	58.26	189	7.811	46	13.63	36	5.78	79	59.07	190
26.1	56.179	97	74.73	236	12.617	65	56.37	220	7.765	15	13.99	30	4.99	66	57.17	238
36.1	56.082		72.37		12.552		54.17		7.750		14.29		4.33		54.79	
n Place	54.674		46.67		10.466		26.13		4.447		30.02		11.200		24.11	
δ, Tan δ	1.381		+0.952		1.275		+0.791		1.021		−0.207		4.730		+4.623	
α, D. α	+0.04		−0.05		+0.05		−0.04		+0.06		+0.01		−0.02		−0.22	
δ, D. δ	*+0.3*		*−0.7*		*+0.3*		*−0.7*		+0.3		−0.7		+0.3		−0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	3 Piscis Australis. Mag. 5.6 Right Ascension.		Declination.		ζ Cygni. Mag. 3.4 Right Ascension.		Declination.		τ Cygni. Mag. 3.8 Right Ascension.		Declination.		α Equulei. Mag. 4.1 Right Ascension.		Declination.	
	h m 21 8		° ′ −27 57		h m 21 9		° ′ +29 53		h m 21 11		° ′ +37 41		h m 21 11		° + 4[illegible]	
	s		″		s		″		s		″		s		″	
Jan. 1.1	22.226	4	34.99	66	23.696	36	16.89	212	27.964	56	35.61	231	40.409	5	17.[illegible]	[illegible]
11.1	22.230	41	34.33	80	23.660	1	14.77	227	27.908	17	33.30	249	40.404	26	16.12	[illegible]
21.1	22.271	78	33.53	95	23.659	38	12.50	231	27.891	24	30.81	257	40.430	57	15.0[illegible]	[illegible]
31.0	22.349	113	32.58	108	23.697	76	10.19	225	27.915	69	28.24	254	40.487	88	13.9[illegible]	[illegible]
Feb. 10.0	22.462	145	31.50	122	23.773	114	7.94	209	27.984	113	25.70	241	40.575	119	13.0[illegible]	[illegible]
20.0	22.607	179	30.28	134	23.887	153	5.85	185	28.097	154	23.29	217	40.694	149	12.24	[illegible]
Mar. 1.9	22.786	209	28.94	143	24.040	189	4.00	152	28.251	197	21.12	182	40.843	180	11.6[illegible]	[illegible]
11.9	22.995	239	27.51	152	24.229	225	2.48	111	28.448	236	19.30	142	41.023	208	11.3[illegible]	[illegible]
21.9	23.234	268	25.99	159	24.454	257	1.37	65	28.684	272	17.88	92	41.231	234	11.39	[illegible]
31.9	23.502	291	24.40	164	24.711	283	0.72	17	28.956	303	16.96	40	41.465	259	11.72	[illegible]
Apr. 10.8	23.793	314	22.76	165	24.994	307	0.55	34	29.259	327	16.56	12	41.724	278	12.37	[illegible]
20.8	24.107	329	21.11	162	25.301	323	0.89	84	29.586	344	16.68	68	42.002	295	13.34	[illegible]
30.8	24.436	341	19.49	156	25.624	332	1.73	131	29.930	354	17.36	119	42.297	306	14.62	[illegible]
May 10.8	24.777	346	17.93	146	25.956	334	3.04	174	30.284	355	18.55	169	42.603	310	16.16	[illegible]
20.7	25.123	343	16.47	131	26.290	327	4.78	212	30.639	346	20.24	211	42.913	305	17.92	[illegible]
30.7	25.466	333	15.16	113	26.617	311	6.90	242	30.985	330	22.35	250	43.218	296	19.85	[illegible]
June 9.7	25.799	313	14.03	94	26.928	290	9.32	269	31.315	305	24.85	277	43.514	278	21.89	[illegible]
19.6	26.112	289	13.09	70	27.218	259	12.01	285	31.620	271	27.62	302	43.792	253	24.00	[illegible]
29.6	26.401	253	12.39	46	27.477	222	14.86	296	31.891	231	30.64	315	44.045	222	26.09	[illegible]
July 9.6	26.654	214	11.93	20	27.699	180	17.82	299	32.122	186	33.79	323	44.267	186	28.15	[illegible]
19.6	26.868	168	11.73	3	27.879	134	20.81	295	32.308	137	37.02	324	44.453	145	30.11	[illegible]
29.5	27.036	119	11.76	27	28.013	87	23.76	286	32.445	84	40.26	317	44.598	101	31.94	[illegible]
Aug. 8.5	27.155	68	12.03	47	28.100	37	26.62	271	32.529	33	43.43	302	44.699	57	33.58	[illegible]
18.5	27.223	18	12.50	63	28.137	11	29.33	249	32.562	18	46.45	283	44.756	13	35.04	[illegible]
28.4	27.241	30	13.13	77	28.126	55	31.82	224	32.544	67	49.28	258	44.769	29	36.28	[illegible]
Sept. 7.4	27.211	74	13.90	84	28.071	94	34.06	196	32.477	109	51.86	230	44.740	66	37.31	79
17.4	27.137	112	14.74	86	27.977	129	36.02	163	32.368	146	54.16	194	44.674	97	38.10	58
27.4	27.025	140	15.60	84	27.848	156	37.65	127	32.222	176	56.10	157	44.577	122	38.68	35
Oct. 7.3	26.885	161	16.44	76	27.692	174	38.92	92	32.046	196	57.67	117	44.455	138	39.03	13
17.3	26.724	170	17.20	66	27.518	184	39.84	52	31.850	209	58.84	74	44.317	146	39.16	6
27.3	26.554	171	17.86	52	27.334	187	40.36	11	31.641	212	59.58	29	44.171	148	39.10	27
Nov. 6.3	26.383	162	18.38	36	27.147	181	40.47	29	31.429	208	59.87	18	44.023	142	38.83	44
16.2	26.221	143	18.74	17	26.966	166	40.18	70	31.221	195	59.69	63	43.881	124	38.39	62
26.2	26.078	119	18.91	1	26.800	148	39.48	109	31.026	174	59.06	108	43.757	106	37.77	78
Dec. 6.2	25.959	91	18.90	20	26.652	122	38.39	143	30.852	150	57.98	150	43.651	83	36.99	91
16.1	25.868	56	18.70	37	26.530	94	36.96	176	30.702	117	56.48	186	43.568	55	36.08	102
26.1	25.812	20	18.33	54	26.436	60	35.20	202	30.585	83	54.62	217	43.513	27	35.06	109
36.1	25.792		17.79		26.376		33.18		30.502		52.45		43.486		33.97	
Mean Place	22.207		30.84		24.176		9.03		28.636		26.11		40.506		14.60	
Sec δ, Tan δ	1.132		−0.531		1.153		+0.575		1.264		+0.773		1.004		+0.086	
$D_\psi\alpha$, $D_\omega\alpha$	+0.07		+0.03		+0.05		−0.03		+0.05		−0.04		+0.06		0.00	
$D_\psi\delta$, $D_\omega\delta$	+0.3		−0.7		+0.3		−0.7		+0.3		−0.7		+0.3		−0.7	

FOR THE UPPER TRANSIT AT WASHINGTON.

ι Capricorni.
Mag. 4.3

Right Ascension.		Declination.	
h m		° ′	
1 17		−17 10	
		″	
699		81.38	
697	2	81.33	5
728	31	81.15	18
791	63	80.85	30
885	94	80.42	43
011	126	79.84	58
167	156	79.08	76
353	186	78.17	91
568	215	77.08	109
809	241	75.84	124
077	268	74.45	139
365	288	72.95	150
672	307	71.36	159
989	317	69.71	165
313	324	68.07	164
636	323	66.47	160
951	315	64.95	152
249	298	63.55	140
524	275	62.33	122
767	243	61.28	105
974	207	60.44	84
139	165	59.83	61
250	120	59.43	40
332	73	59.25	18
358	26	59.27	2
339	19	59.46	19
280	59	59.79	33
167	93	60.22	43
065	122	60.72	50
925	140	61.25	53
774	151	61.78	53
622	152	62.29	51
476	146	62.75	46
345	131	63.14	39
236	109	63.45	31
151	85	63.66	21
005	56	63.79	13
070	25	63.82	3
651		79.32	
047		−0.309	
07		+0.02	
3		−0.1	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	1 Pegasi. Mag. 4.2 Right Ascension.		1 Pegasi. Mag. 4.2 Declination.		γ Pavonis. Mag. 4.3 Right Ascension.		γ Pavonis. Mag. 4.3 Declination.		ζ Capricorni. Mag. 3.9 Right Ascension.		ζ Capricorni. Mag. 3.9 Declination.		g Cygni Mag. 5 Right Ascension.	
	h m		° ′		h m		° ′		h m		° ′		h m	
	21 18		+19 26		21 19		−65 44		21 21		−22 45		21 26	
	s		″		s		″		s		″		s	
Jan. 1.1	14.619	26	61.83	170	35.29	11	43.53	257	55.965	7	80.58	35	22.255	101
11.1	14.593	6	60.13	179	35.18	3	40.96	283	55.958	27	80.23	50	22.154	58
21.1	14.599	40	58.34	181	35.15	6	38.13	303	55.985	60	79.73	65	22.096	10
31.0	14.639	73	56.53	173	35.21	15	35.10	313	56.045	91	79.08	79	22.086	41
Feb. 10.0	14.712	108	54.80	157	35.36	23	31.97	317	56.136	125	78.29	94	22.127	91
20.0	14.820	141	53.23	135	35.59	30	28.80	315	56.261	157	77.35	108	22.218	144
Mar. 1.9	14.961	175	51.88	104	35.89	37	25.65	305	56.418	187	76.27	124	22.362	196
11.9	15.136	207	50.84	68	36.26	43	22.60	292	56.605	218	75.03	136	22.558	242
21.9	15.343	236	50.16	28	36.69	50	19.68	269	56.823	247	73.67	148	22.800	287
31.9	15.579	264	49.88	15	37.19	54	16.99	244	57.070	271	72.19	158	23.087	323
Apr. 10.8	15.843	286	50.03	58	37.73	59	14.55	213	57.341	296	70.61	166	23.410	355
20.8	16.129	304	50.61	100	38.32	63	12.42	177	57.637	314	68.95	168	23.765	377
30.8	16.433	314	51.61	138	38.95	64	10.65	140	57.951	326	67.27	167	24.142	390
May 10.8	16.747	319	52.99	175	39.59	65	9.25	97	58.277	334	65.60	161	24.532	394
20.7	17.066	315	54.74	205	40.24	65	8.28	54	58.611	334	63.99	152	24.926	385
30.7	17.381	303	56.79	228	40.89	62	7.74	8	58.945	326	62.47	140	25.311	369
June 9.7	17.684	285	59.07	246	41.51	58	7.66	36	59.271	309	61.07	121	25.680	341
19.6	17.969	259	61.53	259	42.09	54	8.02	79	59.580	287	59.86	102	26.021	306
29.6	18.228	226	64.12	263	42.63	47	8.81	120	59.867	254	58.84	78	26.327	262
July 9.6	18.454	188	66.75	261	43.10	40	10.01	157	60.121	217	58.06	56	26.589	213
19.6	18.642	146	69.36	253	43.50	31	11.58	188	60.338	174	57.50	30	26.802	159
29.5	18.788	101	71.89	242	43.81	21	13.46	214	60.512	128	57.20	8	26.961	101
Aug. 8.5	18.889	55	74.31	225	44.02	10	15.60	229	60.640	79	57.12	16	27.062	43
18.5	18.944	10	76.56	203	44.12	1	17.89	239	60.719	31	57.28	33	27.105	14
28.5	18.954	33	78.59	180	44.13	9	20.28	238	60.750	16	57.61	49	27.091	68
Sept. 7.4	18.921	71	80.39	153	44.04	19	22.66	228	60.734	58	58.10	62	27.023	117
17.4	18.850	103	81.92	124	43.85	27	24.94	207	60.676	95	58.72	68	26.906	159
27.4	18.747	130	83.16	95	43.58	35	27.01	178	60.581	125	59.40	73	26.747	195
Oct. 7.3	18.617	148	84.11	63	43.23	40	28.79	143	60.456	144	60.13	70	26.552	222
17.3	18.469	158	84.74	31	42.83	43	30.22	98	60.312	156	60.83	65	26.330	240
27.3	18.311	161	85.05	0	42.40	45	31.20	49	60.156	159	61.48	57	26.090	248
Nov. 6.3	18.150	155	85.05	34	41.95	44	31.69	3	59.997	153	62.05	46	25.842	248
16.2	17.995	144	84.71	64	41.51	41	31.66	55	59.844	139	62.51	33	25.594	240
26.2	17.851	125	84.07	93	41.10	37	31.11	106	59.705	117	62.84	18	25.354	221
Dec. 6.2	17.726	104	83.14	122	40.73	31	30.05	154	59.588	92	63.02	4	25.133	198
16.2	17.622	76	81.92	141	40.42	24	28.51	198	59.496	62	63.06	10	24.935	166
26.1	17.546	48	80.48	164	40.18	17	26.53	235	59.434	30	62.96	26	24.769	129
36.1	17.498		78.84		40.01		24.18		59.404		62.70		24.640	
Mean Place	14.864		55.70		35.870		34.26		55.893		77.40		23.141	
Sec δ, Tan δ	1.061		+0.353		2.434		−2.219		1.084		−0.420		1.444	
$D_\psi a$, $D_\omega a$	+0.05		−0.02		+0.10		+0.11		+0.07		+0.02		+0.04	
$D_\psi \delta$, $D_\omega \delta$	+0.3		−0.6		+0.3		−0.6		+0.3		−0.6		+0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

…ington …l Time.	β Aquarii. Mag. 3.1				β Cephei. Mag. 3.3				ξ Aquarii. Mag. 4.8				74 Cygni. Mag. 5.1			
	Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.	
	h m 21 27		° ′ − 5 55		h m 21 27		° ′ +70 11		h m 21 33		° ′ − 8 13		h m 21 33		° ′ +40 2	
	s		″		s		″		s		″		s		″	
…h. 1.1	11.484		72.54		32.60		62.04		20.166		37.15		36.673		36.04	
11.1	11.472	12	73.08	54	32.25	35	59.53	251	20.150	16	37.56	41	36.588	85	33.81	223
21.1	11.490	18	73.56	48	32.01	24	56.68	285	20.165	15	37.90	34	36.541	47	31.36	245
31.0	11.537	47	73.94	38	31.86	15	53.58	310	20.207	42	38.12	22	36.536	5	28.77	259
…b. 10.0	11.615	78	74.18	24	31.82	4	50.36	322	20.281	74	38.22	10	36.574	38	26.19	258
20.0	11.724	109	74.28	10	31.91	9	47.15	321	20.385	104	38.16	6	36.658	84	23.68	251
…r. 2.0	11.862	138	74.18	10	32.12	21	44.09	306	20.518	133	37.90	26	36.789	131	21.37	231
11.9	12.031	169	73.85	33	32.43	31	41.29	280	20.683	165	37.44	46	36.964	175	19.37	200
21.9	12.229	198	73.30	55	32.85	42	38.88	241	20.876	193	36.75	69	37.183	219	17.76	161
31.9	12.454	225	72.49	81	33.36	51	36.94	194	21.099	223	35.84	91	37.443	260	16.60	116
…r. 10.8	12.706	252	71.45	104	33.95	59	35.54	140	21.348	249	34.70	114	37.739	296	15.94	66
20.8	12.980	274	70.18	127	34.60	65	34.74	80	21.620	272	33.36	134	38.064	325	15.83	11
30.8	13.272	292	68.72	146	35.30	70	34.57	17	21.911	291	31.85	151	38.412	348	16.26	43
…y 10.8	13.579	307	67.08	164	36.00	70	35.02	45	22.218	307	30.19	166	38.774	362	17.24	98
20.7	13.891	312	65.34	174	36.69	69	36.07	105	22.532	314	28.44	175	39.141	367	18.71	147
30.7	14.204	313	63.53	181	37.37	68	37.71	164	22.847	315	26.63	181	39.505	364	20.64	193
…ne 9.7	14.509	305	61.69	184	38.00	63	39.86	215	23.155	308	24.83	180	39.854	349	22.97	233
19.7	14.800	291	59.88	181	38.57	57	42.47	261	23.451	296	23.08	175	40.182	328	25.64	267
29.6	15.068	268	58.15	173	39.06	49	45.48	301	23.725	274	21.43	165	40.478	296	28.57	293
…ly 9.6	15.308	240	56.55	160	39.47	41	48.79	331	23.970	245	19.90	153	40.735	257	31.70	313
19.6	15.512	204	55.09	146	39.79	32	52.34	355	24.181	211	18.54	136	40.949	214	34.94	324
29.5	15.677	165	53.81	128	39.99	20	56.04	370	24.353	172	17.38	116	41.113	164	38.22	328
…ug. 8.5	15.798	121	52.75	106	40.09	10	59.80	376	24.482	129	16.42	96	41.225	112	41.47	325
18.5	15.875	77	51.88	87	40.08	1	63.56	376	24.565	83	15.69	73	41.284	59	44.61	314
28.5	15.907	32	51.24	64	39.97	11	67.22	366	24.604	39	15.16	53	41.290	6	47.60	299
…pt. 7.4	15.896	11	50.79	45	39.75	22	70.72	350	24.600	4	14.85	31	41.246	44	50.37	277
17.4	15.847	49	50.54	25	39.44	31	73.98	326	24.558	42	14.72	13	41.157	89	52.86	249
27.4	15.764	83	50.46	8	39.05	39	76.93	295	24.480	78	14.75	3	41.027	130	55.03	217
…ct. 7.4	15.653	111	50.54	8	38.59	46	79.51	258	24.375	105	14.93	18	40.864	163	56.84	181
17.3	15.525	128	50.75	21	38.06	53	81.65	214	24.248	127	15.22	29	40.677	187	58.27	143
27.3	15.385	140	51.06	31	37.50	56	83.32	167	24.110	138	15.60	38	40.473	204	59.26	99
…ov. 6.3	15.243	142	51.46	40	36.91	59	84.45	113	23.969	141	16.05	45	40.261	212	59.80	54
16.2	15.105	138	51.93	47	36.30	61	85.02	57	23.831	138	16.54	49	40.048	213	59.87	7
26.2	14.979	126	52.46	53	35.70	60	84.99	3	23.704	127	17.05	51	39.843	205	59.47	40
…ec. 6.2	14.871	108	53.02	56	35.12	58	84.37	62	23.594	110	17.58	53	39.653	190	58.61	86
16.2	14.785	86	53.60	58	34.59	53	83.17	120	23.505	89	18.10	52	39.485	168	57.30	131
26.1	14.725	60	54.19	59	34.11	48	81.41	176	23.442	63	18.60	50	39.342	143	55.58	172
36.1	14.693	32	54.76	57	33.70	41	79.16	225	23.405	37	19.07	47	39.233	109	53.51	207
…n Place	11.442		73.11		35.732		46.22		20.090		37.29		37.291		24.51	
…δ, Tan δ	1.005		−0.104		2.952		+2.778		1.010		−0.145		1.306		+0.840	
…, $D_m\alpha$	+0.06		+0.01		+0.02		−0.15		+0.06		+0.01		+0.05		−0.04	
…, $D_m\delta$	+0.3		−0.6		+0.3		−0.6		+0.3		−0.6		+0.3		−0.8	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	γ Capricorni. Mag. 3.8 Right Ascension.		Declination.		ε Pegasi. Mag. 2.5 Right Ascension.		Declination.		11 Cephei. Mag. 4.8 Right Ascension.		Declination.		δ Capricorni. Mag. 3. Right Ascension.	
	h m		° ′		h m		° ′		h m		° ′		h m	
	21 35		−17 1		21 40		+ 9 29		21 40		+70 55		21 42	
	s		″		s		″		s		″		s	
Jan. 1.1	29.794		77.78		6.527		42.70		39.54		61.52		27.841	
11.1	29.776	18	77.74	4	6.497	30	41.47	123	39.14	40	59.17	235	27.818	23
21.1	29.789	13	77.56	18	6.493	4	40.22	125	38.86	28	56.43	274	27.824	6
31.0	29.833	44	77.26	30	6.520	27	38.99	123	38.67	19	53.41	302	27.861	37
Feb. 10.0	29.908	75	76.81	45	6.578	58	37.85	114	38.59	8	50.24	317	27.929	68
20.0	30.015	107	76.19	62	6.665	87	36.85	100	38.64	5	47.04	320	28.026	97
Mar. 2.0	30.152	137	75.40	79	6.786	121	36.06	79	38.82	18	43.95	309	28.156	130
11.9	30.320	168	74.44	96	6.939	153	35.52	54	39.11	29	41.09	286	28.317	161
21.9	30.519	199	73.29	115	7.123	184	35.30	22	39.51	40	38.58	251	28.508	191
31.9	30.746	227	71.99	130	7.338	215	35.41	11	40.01	50	36.51	207	28.730	222
Apr. 10.9	31.002	256	70.55	144	7.580	242	35.87	46	40.60	59	34.96	155	28.980	250
20.8	31.280	278	68.97	158	7.849	269	36.68	81	41.25	65	34.00	96	29.255	275
30.8	31.581	301	67.28	160	8.137	288	37.83	115	41.96	71	33.64	36	29.551	296
May 10.8	31.895	314	65.57	171	8.441	304	39.29	146	42.69	73	33.89	25	29.864	313
20.7	32.217	322	63.83	174	8.752	311	41.02	173	43.41	72	34.78	89	30.187	323
30.7	32.543	326	62.13	170	9.065	313	42.97	195	44.11	70	36.24	146	30.512	325
June 9.7	32.862	319	60.53	160	9.371	306	45.09	212	44.78	67	38.24	200	30.833	321
19.7	33.168	306	59.04	149	9.663	292	47.31	222	45.40	62	40.72	248	31.141	308
29.6	33.453	285	57.72	132	9.934	271	49.58	227	45.94	54	43.62	290	31.430	289
July 9.6	33.710	257	56.59	113	10.176	242	51.84	226	46.40	46	46.82	320	31.690	260
19.6	33.931	221	55.68	91	10.384	208	54.05	221	46.76	36	50.31	349	31.916	226
29.6	34.112	181	55.00	68	10.553	169	56.14	209	47.00	24	53.98	367	32.103	187
Aug. 8.5	34.249	137	54.55	45	10.679	126	58.09	195	47.14	14	57.74	376	32.246	143
18.5	34.339	90	54.34	21	10.761	82	59.85	176	47.18	4	61.52	378	32.343	97
28.5	34.383	44	54.34	0	10.799	38	61.41	156	47.10	8	65.24	372	32.393	50
Sept. 7.4	34.382	1	54.53	19	10.796	3	62.74	133	46.92	18	68.81	357	32.398	5
17.4	34.339	43	54.87	34	10.753	43	63.82	108	46.63	29	72.19	338	32.362	36
27.4	34.260	79	55.33	46	10.676	77	64.67	85	46.26	37	75.27	308	32.289	73
Oct. 7.4	34.150	110	55.87	54	10.573	103	65.27	60	45.81	45	77.99	272	32.185	104
17.3	34.020	130	56.46	59	10.448	125	65.63	36	45.30	51	80.31	232	32.059	126
27.3	33.877	143	57.06	60	10.311	137	65.74	11	44.73	57	82.16	185	31.920	139
Nov. 6.3	33.729	148	57.63	57	10.169	142	65.63	11	44.13	60	83.50	134	31.775	145
16.3	33.585	144	58.15	52	10.029	140	65.28	35	43.51	62	84.28	78	31.633	142
26.2	33.451	134	58.61	46	9.898	131	64.73	55	42.89	62	84.46	18	31.500	133
Dec. 6.2	33.336	115	58.98	37	9.781	117	63.98	75	42.29	60	84.04	42	31.383	117
16.2	33.243	93	59.23	25	9.682	99	63.06	92	41.72	57	83.02	102	31.287	96
26.1	33.176	67	59.39	16	9.607	75	61.98	108	41.21	51	81.45	157	31.216	71
36.1	33.138	38	59.45	6	9.556	51	60.79	119	40.76	45	79.36	209	31.171	45
Mean Place	29.676		75.90		6.553		37.98		42.615		44.50		27.698	
Sec δ, Tan δ	1.046		−0.306		1.014		+0.167		3.061		+2.893		1.043	
Dψ a, Dω a	+0.07		+0.02		+0.06		−0.01		+0.02		−0.16		+0.06	
Dψ δ, Dω δ	+0.3		−0.6		+0.3		−0.6		+0.3		−0.6		+0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

hington n Time.	π^2 Cygni. Mag. 4.3				μ Capricorni. Mag. 5.2				γ Gruis. Mag. 3.2				16 Pegasi. Mag. 5.0			
	Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.	
	h m 21 43		° ′ +48 55		h m 21 48		° ′ −13 56		h m 21 48		° ′ −37 44		h m 21 49		° ′ +25 31	
	s		″		s		″		s		″		s		″	
ı. 1.1	42.658		44.43		46.502		36.44		54.568		87.48		16.890		72.39	
11.1	42.525	133	42.14	229	46.475	27	36.56	12	54.520	48	86.41	107	16.830	60	70.63	176
21.1	42.436	89	39.56	258	46.475	0	36.57	1	54.510	10	85.09	132	16.800	30	68.73	190
31.0	42.396	40	36.80	276	46.506	31	36.45	12	54.537	27	83.55	154	16.801	1	66.76	197
b. 10.0	42.408	12	33.96	284	46.566	60	36.16	29	54.603	66	81.82	173	16.838	37	64.80	196
20.0	42.474	66	31.16	280	46.656	90	35.71	45	54.707	104	79.93	189	16.910	72	62.95	185
r. 2.0	42.597	123	28.53	263	46.778	122	35.07	64	54.848	141	77.91	202	17.020	110	61.29	166
11.9	42.775	178	26.16	237	46.931	153	34.25	82	55.027	179	75.79	212	17.167	147	59.89	140
21.9	43.006	231	24.17	199	47.114	183	33.24	101	55.244	217	73.61	218	17.350	183	58.85	104
31.9	43.286	280	22.64	153	47.329	215	32.02	122	55.496	252	71.40	221	17.569	219	58.21	64
r. 10.9	43.610	324	21.62	102	47.571	242	30.63	139	55.781	285	69.21	219	17.821	252	57.99	22
20.8	43.971	361	21.17	45	47.840	269	29.09	154	56.096	315	67.09	212	18.101	280	58.24	25
30.8	44.358	387	21.29	12	48.130	290	27.41	168	56.436	340	65.05	204	18.405	304	58.95	71
y 10.8	44.764	406	21.98	69	48.438	308	25.66	175	56.797	361	63.16	189	18.724	319	60.09	114
20.7	45.176	412	23.22	124	48.757	319	23.86	180	57.170	373	61.47	169	19.053	329	61.64	155
30.7	45.585	409	24.98	176	49.079	322	22.07	179	57.548	378	60.00	147	19.384	331	63.54	190
ne 9.7	45.978	393	27.20	222	49.397	318	20.33	174	57.922	374	58.81	119	19.708	324	65.77	223
19.7	46.347	369	29.82	262	49.704	307	18.69	164	58.284	362	57.91	90	20.015	307	68.23	246
29.6	46.680	333	32.77	295	49.993	289	17.18	151	58.623	339	57.34	57	20.300	285	70.88	265
ly 9.6	46.971	291	35.96	319	50.254	261	15.86	132	58.931	308	57.10	24	20.555	255	73.64	276
19.6	47.212	241	39.33	337	50.483	229	14.75	111	59.200	269	57.19	9	20.773	218	76.44	280
29.6	47.396	184	42.79	346	50.673	190	13.85	90	59.423	223	57.60	41	20.949	176	79.23	279
ıg. 8.5	47.523	127	46.28	349	50.820	147	13.19	66	59.595	172	58.30	70	21.081	132	81.95	272
18.5	47.591	68	49.72	344	50.922	102	12.77	42	59.713	118	59.25	95	21.166	85	84.52	257
28.5	47.599	8	53.03	331	50.978	56	12.58	19	59.775	62	60.43	118	21.205	39	86.94	242
pt. 7.4	47.549	50	56.14	311	50.990	12	12.58	0	59.781	6	61.74	131	21.199	6	89.12	218
17.4	47.447	102	59.01	287	50.960	30	12.77	19	59.736	45	63.15	141	21.153	46	91.05	193
27.4	47.299	148	61.57	256	50.892	68	13.10	33	59.646	90	64.58	143	21.070	83	92.70	165
ct. 7.4	47.112	187	63.76	219	50.796	96	13.54	44	59.516	130	65.96	138	20.956	114	94.04	134
17.3	46.892	220	65.55	179	50.676	120	14.06	52	59.355	161	67.23	127	20.820	136	95.04	100
27.3	46.651	241	66.89	134	50.542	134	14.63	57	59.176	179	68.31	108	20.669	151	95.70	66
ov. 6.3	46.396	255	67.75	86	50.402	140	15.20	57	58.986	190	69.18	87	20.509	160	96.01	31
16.3	46.135	261	68.10	35	50.262	140	15.75	55	58.797	189	69.78	60	20.348	161	95.96	5
26.2	45.880	255	67.93	17	50.131	131	16.27	52	58.618	179	70.08	30	20.192	156	95.54	42
ec. 6.2	45.637	243	67.24	69	50.015	116	16.73	46	58.457	161	70.08	0	20.049	143	94.77	77
16.2	45.415	222	66.04	120	49.918	97	17.12	39	58.320	137	69.77	31	19.922	127	93.68	109
26.1	45.221	194	64.38	166	49.845	73	17.42	30	58.213	107	69.15	62	19.817	105	92.29	139
36.1	45.062	159	62.29	209	49.796	49	17.62	20	58.140	73	68.25	90	19.738	79	90.64	165
n Place	43.539		30.44		46.341		35.42		54.415		81.18		17.082		63.21	
δ, Tan δ	1.522		+1.147		1.030		−0.248		1.265		−0.774		1.108		+0.478	
ı, $D_\omega \alpha$	+0.04		−0.06		+0.06		+0.01		+0.07		+0.04		+0.05		−0.03	
), $D_\omega \delta$	+0.3		−0.6		+0.3		−0.5		+0.3		−0.5		+0.3		−0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	79 Draconis. Mag. 6.6				ε Indi. Mag. 4.7				20 Pegasi. Mag. 5.7				α Aqu… Mag. 3…	
	Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.	
	h m		° ′		h m		° ′		h m		° ′		h m	
	21 51		+73 18		21 57		−57 7		21 57		+12 43		22 1	
	s		″		s		″		s		″		s	
Jan. 1.1	45.79	48	52.22	222	1.080	109	49.13	188	2.737	47	24.72	128	31.448	39
11.1	45.31	38	50.00	265	0.971	53	47.25	222	2.690	19	23.44	135	31.409	14
21.1	44.93	27	47.35	295	0.918	6	45.03	248	2.671	8	22.09	135	31.395	13
31.1	44.66	12	44.40	315	0.924	64	42.55	268	2.679	39	20.74	128	31.408	41
Feb. 10.0	44.54	1	41.25	322	0.988	122	39.87	282	2.718	71	19.46	115	31.449	71
20.0	44.55	15	38.03	313	1.110	179	37.05	291	2.789	103	18.31	97	31.520	102
Mar. 2.0	44.70	29	34.90	294	1.289	236	34.14	292	2.892	136	17.34	70	31.622	133
11.9	44.99	42	31.96	263	1.525	290	31.22	288	3.028	170	16.64	42	31.755	166
21.9	45.41	54	29.33	221	1.815	340	28.34	279	3.198	203	16.22	7	31.921	197
31.9	45.95	64	27.12	170	2.155	390	25.55	262	3.401	232	16.15	30	32.118	226
Apr. 10.9	46.59	72	25.42	114	2.545	432	22.93	243	3.633	261	16.45	67	32.344	255
20.8	47.31	77	24.28	56	2.977	465	20.50	216	3.894	283	17.12	102	32.599	277
30.8	48.08	81	23.72	7	3.442	494	18.34	186	4.177	302	18.14	135	32.876	296
May 10.8	48.89	82	23.79	70	3.936	512	16.48	151	4.479	313	19.49	167	33.172	309
20.8	49.71	81	24.49	128	4.448	520	14.97	111	4.792	316	21.16	191	33.481	314
30.7	50.52	76	25.77	182	4.968	516	13.86	70	5.108	312	23.07	213	33.795	312
June 9.7	51.28	70	27.59	232	5.484	499	13.16	28	5.420	300	25.20	226	34.107	301
19.7	51.98	63	29.91	276	5.983	470	12.88	16	5.720	282	27.46	234	34.408	284
29.6	52.61	53	32.67	313	6.453	431	13.04	58	6.002	254	29.80	237	34.692	259
July 9.6	53.14	43	35.80	342	6.884	377	13.62	100	6.256	222	32.17	234	34.951	227
19.6	53.57	31	39.22	361	7.261	317	14.62	137	6.478	183	34.51	226	35.178	192
29.6	53.88	18	42.83	375	7.578	247	15.99	171	6.661	143	36.77	212	35.370	150
Aug. 8.5	54.06	7	46.58	380	7.825	171	17.70	196	6.804	98	38.89	196	35.520	107
18.5	54.13	6	50.38	376	7.996	92	19.66	217	6.902	54	40.85	176	35.627	63
28.5	54.07	18	54.14	365	8.088	14	21.83	227	6.956	12	42.61	154	35.690	21
Sept. 7.5	53.89	29	57.79	346	8.102	62	24.10	229	6.968	29	44.15	129	35.711	19
17.4	53.60	40	61.25	324	8.040	130	26.39	222	6.939	64	45.44	104	35.692	54
27.4	53.20	48	64.49	291	7.910	191	28.61	205	6.875	91	46.48	78	35.638	85
Oct. 7.4	52.72	57	67.40	248	7.719	240	30.66	181	6.784	116	47.26	53	35.553	106
17.3	52.15	63	69.88	204	7.479	273	32.47	148	6.668	129	47.79	26	35.447	123
27.3	51.52	68	71.92	152	7.206	296	33.95	108	6.539	139	48.05	1	35.324	131
Nov. 6.3	50.84	70	73.44	98	6.910	301	35.03	64	6.400	140	48.06	25	35.193	131
16.3	50.14	71	74.42	39	6.609	293	35.67	17	6.260	133	47.81	48	35.062	126
26.2	49.43	70	74.81	22	6.316	269	35.84	31	6.127	122	47.33	71	34.936	115
Dec. 6.2	48.73	67	74.59	82	6.047	239	35.53	78	6.005	108	46.62	91	34.821	100
16.2	48.06	62	73.77	141	5.808	194	34.75	123	5.897	87	45.71	109	34.721	80
26.2	47.44	54	72.36	194	5.614	147	33.52	164	5.810	65	44.62	125	34.641	58
36.1	46.90		70.42		5.467		31.88		5.745		43.37		34.583	
Mean Place	49.247		33.99		1.104		39.60		2.716		18.54		31.295	
Sec δ, Tan δ	3.483		+3.336		1.842		−1.547		1.025		+0.226		1.000	
$D_\psi \alpha$, $D_\omega \alpha$	+0.01		−0.19		+0.08		+0.09		+0.06		−0.01		+0.06	
$D_\psi \delta$, $D_\omega \delta$	+0.3		−0.5		+0.3		−0.5		+0.3		−0.5		+0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

ι Aquarii. Mag. 4.4				20 Cephei. Mag. 5.4				α Gruis. Mag. 2.2				ι Pegasi. Mag. 4.0			
ight ension		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.	
m		° ′		h m		° ′		h m		° ′		h m		° ′	
1		−14 15		22 2		+62 22		22 3		−47 21		22 3		+24 56	
		″		s		″		s		″		s		″	
582	39	83.36	12	27.56	27	66.88	217	0.630	86	57.66	147	8.673	68	30.90	166
543	12	83.48	1	27.29	21	64.71	257	0.544	45	56.19	178	8.605	41	29.24	180
531	17	83.47	15	27.08	14	62.14	285	0.499	1	54.41	205	8.564	10	27.44	188
548	45	83.32	32	26.94	6	59.29	303	0.498	44	52.36	225	8.554	24	25.56	189
593	76	83.00	48	26.88	2	56.26	308	0.542	90	50.11	243	8.578	59	23.67	180
569	107	82.52	68	26.90	10	53.18	300	0.632	135	47.68	256	8.637	94	21.87	161
776	138	81.84	86	27.00	19	50.18	280	0.767	180	45.12	262	8.731	133	20.26	138
914	171	80.98	107	27.19	26	47.38	248	0.947	225	42.50	265	8.864	171	18.88	104
085	203	79.91	127	27.45	34	44.90	206	1.172	266	39.85	262	9.035	207	17.84	66
288	232	78.64	144	27.79	41	42.84	157	1.438	306	37.23	254	9.242	241	17.18	25
520	260	77.20	160	28.20	47	41.27	102	1.744	343	34.69	243	9.483	272	16.93	19
780	284	75.60	172	28.67	50	40.25	42	2.087	374	32.26	225	9.755	297	17.12	64
064	304	73.88	181	29.17	53	39.83	18	2.461	399	30.01	201	10.052	315	17.76	108
368	317	72.07	185	29.70	55	40.01	78	2.860	416	28.00	175	10.367	328	18.84	148
685	323	70.22	184	30.25	54	40.79	136	3.276	425	26.25	144	10.695	332	20.32	184
008	321	68.38	179	30.79	53	42.15	190	3.701	423	24.81	108	11.027	328	22.16	215
329	311	66.59	168	31.32	49	44.05	235	4.124	412	23.73	72	11.355	315	24.31	240
640	295	64.91	155	31.81	45	46.40	278	4.536	389	23.01	32	11.670	293	26.71	259
935	270	63.36	135	32.26	40	49.18	313	4.925	357	22.69	7	11.963	266	29.30	271
205	238	62.01	114	32.66	32	52.31	338	5.282	315	22.76	45	12.229	232	32.01	277
.443	200	60.87	92	32.98	25	55.69	357	5.597	264	23.21	82	12.461	191	34.78	275
.643	159	59.95	66	33.23	18	59.26	368	5.861	208	24.03	116	12.652	147	37.53	269
.802	114	59.29	43	33.41	10	62.94	372	6.069	146	25.19	142	12.799	102	40.22	256
.916	68	58.86	19	33.51	2	66.66	367	6.215	83	26.61	166	12.901	56	42.78	241
.984	23	58.67	2	33.53	6	70.33	353	6.298	19	28.27	180	12.957	10	45.19	218
.007	18	58.69	22	33.47	14	73.86	335	6.317	42	30.07	188	12.967	30	47.37	195
.989	56	58.91	36	33.33	20	77.21	308	6.275	99	31.95	187	12.937	68	49.32	167
.933	87	59.27	49	33.13	25	80.29	275	6.176	146	33.82	178	12.869	98	50.99	138
.846	112	59.76	57	32.88	31	83.04	237	6.030	184	35.60	160	12.771	125	52.37	106
.734	128	60.33	61	32.57	35	85.41	192	5.846	213	37.20	137	12.646	141	53.43	70
.606	136	60.94	62	32.22	37	87.33	141	5.633	228	38.57	106	12.505	151	54.13	37
.470	138	61.56	60	31.85	39	88.74	88	5.405	233	39.63	70	12.354	155	54.50	3
.332	132	62.16	56	31.46	40	89.62	32	5.172	227	40.33	31	12.199	151	54.53	33
.200	119	62.72	49	31.06	40	89.94	27	4.945	209	40.64	8	12.048	143	54.20	67
.081	103	63.21	41	30.66	37	89.67	84	4.736	185	40.56	48	11.905	128	53.53	99
.978	82	63.62	32	30.29	34	88.83	141	4.551	152	40.08	89	11.777	109	52.54	129
.896	57	63.94	20	29.95	30	87.42	190	4.399	116	39.19	125	11.668	87	51.25	153
.839		64.14		29.65		85.52		4.283		37.94		11.581		49.72	
.362		82.40		29.121		49.19		0.476		49.43		8.777		21.20	
.032		−0.254		2.157		+1.912		1.476		−1.086		1.103		+0.465	
06		+0.01		+0.04		−0.11		+0.08		+0.06		+0.05		−0.03	
		−0.5		+0.3		−0.5		+0.3		−0.5		+0.3		−0.5	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	θ Pegasi. Mag. 3.7 Right Ascension.		θ Pegasi. Declination.		π Pegasi. Mag. 4.4 Right Ascension.		π Pegasi. Declination.		ζ Cephei. Mag. 3.6 Right Ascension.		ζ Cephei. Declination.		24 Ce[phei] Mag. Right Ascension.
	h m		° ′		h m		° ′		h m		° ′		h m
	22 6		+5 47		22 6		+32 46		22 7		+57 47		22 8
	s		″		s		″		s		″		s
Jan. 1.1	0.934		25.43		17.768		25.73		57.225		47.99		10.08
11.1	0.887	47	24.44	99	17.679	89	23.91	182	57.004	221	45.87	212	9.61
21.1	0.866	21	23.44	100	17.620	59	21.85	206	56.832	172	43.38	249	9.23
31.1	0.871	5	22.47	97	17.594	26	19.67	218	56.718	114	40.61	277	8.95
Feb. 10.0	0.906	35	21.58	89	17.605	11	17.45	222	56.668	50	37.67	294	8.79
20.0	0.970	64	20.85	73	17.653	48	15.30	215	56.685	17	34.69	298	8.76
Mar. 2.0	1.065	95	20.29	56	17.744	91	13.29	201	56.775	90	31.78	291	8.86
12.0	1.194	129	19.99	30	17.876	132	11.53	176	56.936	161	29.08	270	9.08
21.9	1.356	162	19.95	4	18.050	174	10.09	144	57.168	232	26.69	239	9.44
31.9	1.549	193	20.22	27	18.265	215	9.06	103	57.465	297	24.71	198	9.90
Apr. 10.9	1.774	225	20.81	59	18.517	252	8.47	59	57.822	357	23.22	149	10.47
20.8	2.027	253	21.71	90	18.801	284	8.36	11	58.229	407	22.28	94	11.11
30.8	2.304	277	22.92	121	19.114	313	8.74	38	58.676	447	21.91	37	11.82
May 10.8	2.599	295	24.40	148	19.446	332	9.61	87	59.149	473	22.13	22	12.57
20.8	2.909	310	26.13	173	19.791	345	10.94	133	59.636	487	22.94	81	13.34
30.7	3.224	315	28.04	191	20.140	349	12.69	175	60.124	488	24.32	138	14.10
June 9.7	3.537	313	30.10	206	20.484	344	14.82	213	60.600	476	26.22	190	14.84
19.7	3.839	302	32.24	214	20.814	330	17.25	243	61.049	449	28.56	234	15.53
29.7	4.125	286	34.41	217	21.121	307	19.94	269	61.461	412	31.32	276	16.16
July 9.6	4.385	260	36.55	214	21.398	277	22.80	286	61.826	365	34.41	309	16.70
19.6	4.615	230	38.61	206	21.638	240	25.77	297	62.135	309	37.75	334	17.14
29.6	4.807	192	40.56	195	21.835	197	28.78	301	62.380	245	41.28	353	17.49
Aug. 8.5	4.960	153	42.35	179	21.987	152	31.77	299	62.557	177	44.89	361	17.73
18.5	5.069	109	43.94	159	22.090	103	34.68	291	62.666	109	48.53	364	17.86
28.5	5.135	66	45.33	139	22.144	54	37.45	277	62.703	37	52.12	359	17.85
Sept. 7.5	5.158	23	46.48	115	22.152	8	40.01	256	62.672	31	55.57	345	17.75
17.4	5.142	16	47.42	94	22.116	36	42.35	234	62.576	96	58.83	326	17.55
27.4	5.091	51	48.11	69	22.040	76	44.39	204	62.422	154	61.83	300	17.24
Oct. 7.4	5.009	82	48.58	47	21.930	110	46.12	173	62.215	207	64.49	266	16.84
17.4	4.906	103	48.83	25	21.794	136	47.52	140	61.965	250	66.78	229	16.36
27.3	4.785	121	48.88	5	21.638	156	48.53	101	61.680	285	68.63	185	15.82
Nov. 6.3	4.655	130	48.73	15	21.469	169	49.16	63	61.369	311	69.99	136	15.23
16.3	4.524	131	48.39	34	21.296	173	49.38	22	61.044	325	70.83	84	14.60
26.2	4.397	127	47.89	50	21.124	172	49.18	20	60.714	330	71.12	29	13.96
Dec. 6.2	4.280	117	47.22	67	20.961	163	48.58	60	60.389	325	70.85	27	13.33
16.2	4.177	103	46.44	78	20.810	151	47.58	100	60.080	309	70.02	83	12.71
26.2	4.092	85	45.54	90	20.679	131	46.22	136	59.795	285	68.65	137	12.13
36.1	4.029	63	44.56	98	20.571	108	44.54	168	59.546	249	66.79	186	11.61
Mean Place	0.805		20.84		17.996		13.86		58.365		30.65		12.885
Sec δ, Tan δ	1.005		+0.101		1.189		+0.644		1.876		+1.588		3.225
$D_\psi \alpha$, $D_\omega \alpha$	+0.06		−0.01		+0.05		−0.04		+0.04		−0.09		+0.02
$D_\psi \delta$, $D_\omega \delta$	+0.3		−0.5		+0.3		−0.5		+0.4		−0.5		+0.4

FOR THE UPPER TRANSIT AT WASHINGTON.

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	8 Lacertæ. Mag. 4.6 Right Ascension.		8 Lacertæ. Declination.		π Aquarii. Mag. 4.6 Right Ascension.		π Aquarii. Declination.		σ Aquarii. Mag. 4.9 Right Ascension.		σ Aquarii. Declination.		α Lac… Mag. Right Ascension.	
	h m		° ′		h m		° ′		h m		° ′		h m	
	22 20		+51 48		22 21		+ 0 57		22 26		−11 5		22 27	
	s		″		s		″		s		″		s	
Jan. 1.2	16.946	184	63.41	198	2.526	54	24.30	77	15.710	56	70.69	26	51.662	175
11.1	16.762	144	61.43	233	2.472	30	23.53	75	15.654	32	70.95	16	51.487	141
21.1	16.618	99	59.10	261	2.442	6	22.78	67	15.622	8	71.11	2	51.346	98
31.1	16.519	46	56.49	277	2.436	22	22.11	58	15.614	21	71.13	13	51.248	50
Feb. 10.0	16.473	10	53.72	281	2.458	50	21.53	43	15.635	48	71.00	33	51.198	3
20.0	16.483	69	50.91	275	2.508	83	21.10	23	15.683	80	70.67	51	51.201	59
Mar. 2.0	16.552	131	48.16	255	2.591	114	20.87	2	15.763	112	70.16	73	51.260	118
12.0	16.683	192	45.61	226	2.705	147	20.85	25	15.875	145	69.43	93	51.378	177
21.9	16.875	250	43.35	188	2.852	180	21.10	51	16.020	178	68.50	116	51.555	235
31.9	17.125	304	41.47	140	3.032	212	21.61	80	16.198	211	67.34	136	51.790	286
Apr. 10.9	17.429	350	40.07	88	3.244	241	22.41	108	16.409	241	65.98	155	52.076	333
20.9	17.779	389	39.19	33	3.485	269	23.49	134	16.650	269	64.43	171	52.409	370
30.8	18.168	416	38.86	24	3.754	289	24.83	158	16.919	291	62.72	183	52.779	401
May 10.8	18.584	434	39.10	80	4.043	305	26.41	176	17.210	308	60.89	190	53.180	419
20.8	19.018	438	39.90	134	4.348	313	28.17	192	17.518	318	58.99	194	53.599	426
30.7	19.456	430	41.24	184	4.661	315	30.09	201	17.836	320	57.05	192	54.025	422
June 9.7	19.886	414	43.08	228	4.976	306	32.10	205	18.156	315	55.13	185	54.447	407
19.7	20.300	384	45.36	267	5.282	293	34.15	205	18.471	300	53.28	174	54.854	380
29.7	20.684	346	48.03	299	5.575	269	36.20	199	18.771	281	51.54	156	55.234	346
July 9.6	21.030	299	51.02	323	5.844	242	38.19	189	19.052	251	49.98	138	55.580	302
19.6	21.329	245	54.25	339	6.086	206	40.08	174	19.303	217	48.60	115	55.882	251
29.6	21.574	188	57.64	348	6.292	167	41.82	154	19.520	178	47.45	92	56.133	196
Aug. 8.6	21.762	127	61.12	350	6.459	125	43.36	135	19.698	135	46.53	66	56.329	138
18.5	21.889	66	64.62	345	6.584	82	44.71	112	19.833	92	45.87	41	56.467	79
28.5	21.955	5	68.07	332	6.666	40	45.83	90	19.925	47	45.46	17	56.546	21
Sept. 7.5	21.960	53	71.39	313	6.706	0	46.73	66	19.972	5	45.29	3	56.567	34
17.4	21.907	105	74.52	288	6.706	37	47.39	45	19.977	32	45.32	23	56.533	86
27.4	21.802	151	77.40	256	6.669	69	47.84	23	19.945	66	45.55	37	56.447	131
Oct. 7.4	21.651	189	79.96	219	6.600	92	48.07	5	19.879	92	45.92	49	56.316	169
17.4	21.462	223	82.15	178	6.508	112	48.12	12	19.787	112	46.41	58	56.147	201
27.3	21.239	244	83.93	132	6.396	122	48.00	29	19.675	124	46.99	62	55.946	224
Nov. 6.3	20.995	260	85.25	83	6.274	126	47.71	41	19.551	129	47.61	64	55.722	239
16.3	20.735	265	86.08	31	6.148	125	47.30	52	19.422	128	48.25	62	55.483	246
26.3	20.470	263	86.39	22	6.023	116	46.78	63	19.294	119	48.87	59	55.237	245
Dec. 6.2	20.207	252	86.17	76	5.907	105	46.15	71	19.175	109	49.46	53	54.992	237
16.2	19.955	234	85.41	127	5.802	90	45.44	75	19.066	92	49.99	45	54.755	220
26.2	19.721	204	84.14	173	5.712	69	44.69	78	18.974	72	50.44	36	54.535	197
36.1	19.517		82.41		5.643		43.91		18.902		50.80		54.338	
Mean Place	17.636		46.37		2.291		20.70		15.390		70.87		52.200	
Sec δ, Tan δ	1.618		+1.272		1.000		+0.017		1.019		−0.196		1.551	
$D_\psi\alpha$, $D_\omega\alpha$	+0.05		−0.08		+0.06		0.00		+0.06		+0.01		+0.05	
$D_\psi\delta$, $D_\omega\delta$	+0.4		−0.4		+0.4		−0.4		+0.4		−0.4		+0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

...m ...ne.	υ Aquarii. Mag. 5.3 Right Ascension.		Declination.		226 B. Cephei. Mag. 5.7 Right Ascension.		Declination.		η Aquarii. Mag. 4.1 Right Ascension.		Declination.		10 Lacertæ. Mag. 4.9 Right Ascension.		Declination.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	22 30		−21 7		22 30		+75 47		22 31		− 0 32		22 35		+38 36	
	s		″		s		″		s		″		s		″	
.2	9.663		64.66		45.96		76.42		5.799		40.91		31.956		79.34	
.1	9.601	62	64.51	15	45.29	67	74.68	174	5.739	60	41.61	70	31.830	126	77.63	171
.1	9.562	39	64.17	34	44.72	57	72.44	224	5.701	38	42.27	66	31.729	101	75.62	201
.1	9.551	11	63.64	53	44.27	45	69.80	264	5.688	13	42.86	59	31.662	67	73.42	220
.1	9.568	17	62.89	75	43.98	29	66.87	293	5.701	13	43.34	48	31.631	31	71.10	232
.0	9.614	46	61.96	93	43.83	15	63.75	312	5.741	40	43.68	34	31.641	10	68.77	233
.0	9.693	79	60.82	114	43.85	2	60.58	317	5.813	72	43.81	13	31.696	55	66.52	225
.0	9.806	113	59.50	132	44.04	19	57.51	307	5.917	104	43.73	8	31.797	101	64.46	206
.9	9.953	147	57.99	151	44.38	34	54.63	288	6.054	137	43.40	33	31.945	148	62.67	179
.9	10.135	182	56.31	168	44.88	50	52.08	255	6.226	172	42.80	60	32.141	196	61.25	142
.9	10.351	216	54.51	180	45.52	64	49.95	213	6.430	204	41.93	87	32.381	240	60.26	99
.9	10.598	247	52.60	191	46.28	76	48.32	163	6.665	235	40.79	114	32.660	279	59.74	52
.8	10.873	275	50.61	199	47.12	84	47.24	108	6.929	264	39.41	138	32.975	315	59.71	3
.8	11.173	300	48.59	202	48.03	91	46.76	48	7.215	286	37.79	162	33.318	343	60.20	49
.8	11.491	318	46.59	200	48.97	94	46.88	12	7.519	304	36.01	178	33.678	360	61.17	97
.8	11.820	329	44.65	194	49.92	95	47.60	72	7.832	313	34.08	193	34.048	370	62.61	144
.7	12.153	333	42.83	182	50.85	93	48.90	130	8.147	315	32.07	201	34.418	370	64.47	186
.7	12.482	329	41.19	164	51.74	89	50.74	184	8.458	311	30.03	204	34.778	360	66.72	225
.7	12.797	315	39.74	145	52.56	82	53.07	233	8.755	297	28.01	202	35.119	341	69.27	255
.6	13.091	294	38.55	119	53.28	72	55.83	276	9.031	276	26.06	195	35.431	312	72.07	280
.6	13.357	266	37.60	95	53.90	62	58.96	313	9.279	248	24.23	183	35.709	278	75.05	298
9.6	13.587	230	36.94	66	54.40	50	62.38	342	9.494	215	22.56	167	35.945	236	78.15	310
8.6	13.777	190	36.58	36	54.76	36	66.00	362	9.670	176	21.07	149	36.135	190	81.29	314
8.5	13.923	146	36.49	9	54.99	23	69.75	375	9.805	135	19.80	127	36.276	141	84.40	311
8.5	14.023	100	36.67	18	55.08	9	73.57	382	9.898	93	18.76	104	36.367	91	87.41	301
7.5	14.076	53	37.09	42	55.03	5	77.37	380	9.948	50	17.95	81	36.407	40	90.29	288
7.4	14.085	9	37.70	61	54.84	19	81.07	370	9.957	9	17.37	58	36.401	6	92.96	267
27.4	14.052	33	38.48	78	54.53	31	84.59	352	9.929	28	17.00	37	36.352	49	95.40	244
7.4	13.983	69	39.36	88	54.10	43	87.86	327	9.869	60	16.84	16	36.264	88	97.53	213
17.4	13.887	96	40.29	93	53.56	54	90.80	294	9.785	84	16.86	2	36.143	121	99.33	180
27.3	13.767	120	41.23	94	52.92	64	93.35	255	9.681	104	17.05	19	35.997	146	100.77	144
6.3	13.635	132	42.12	89	52.21	71	95.44	209	9.563	118	17.38	33	35.831	166	101.81	104
16.3	13.496	139	42.92	80	51.45	76	97.01	157	9.410	123	17.82	44	35.654	177	102.42	61
26.3	13.358	138	43.60	68	50.65	80	98.02	101	9.318	122	18.36	54	35.471	183	102.59	17
6.2	13.226	132	44.14	54	49.83	82	98.42	40	9.202	116	18.98	62	35.289	182	102.32	27
16.2	13.108	118	44.51	37	49.01	82	98.20	22	9.095	107	19.66	68	35.114	175	101.60	72
26.2	13.006	102	44.68	17	48.23	78	97.38	82	9.003	92	20.38	72	34.952	162	100.46	114
36.1	12.926	80	44.68	0	47.52	71	95.96	142	8.928	75	21.11	73	34.808	144	98.95	151
...ace	9.299		62.09		49.232		55.01		5.504		44.30		32.103		64.45	
...an δ	1.072		−0.386		4.078		+3.953		1.000		−0.009		1.280		+0.799	
... α	+0.06		+0.02		+0.02		−0.24		+0.06		0.00		+0.05		−0.05	
... δ	+0.4		−0.4		+0.4		−0.4		+0.4		−0.4		+0.4		−0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ε Piscis Australis. Mag. 4.2 Right Ascension.		Declination.		ζ Pegasi. Mag. 3.6 Right Ascension.		Declination.		β Gruis. Mag. 2.2 Right Ascension.		Declination.		η Pega Mag. 3 Right Ascension.	
	h m 22 36		° ′ −27 28		h m 22 37		° ′ +10 23		h m 22 37		° ′ −47 18		h m 22 39	
	s		″		s		″		s		″		s	
Jan. 1.2	4.445		41.72		19.577		58.55		43.390		77.70		6.608	
11.1	4.371	74	41.32	40	19.508	69	57.49	106	43.263	127	76.45	125	6.506	102
21.1	4.321	50	40.66	66	19.458	50	56.37	112	43.172	91	74.84	161	6.428	78
31.1	4.299	22	39.78	88	19.433	25	55.25	112	43.120	52	72.91	193	6.376	52
Feb. 10.1	4.307	8	38.67	111	19.434	1	54.18	107	43.110	10	70.70	221	6.356	20
20.0	4.348	41	37.34	133	19.465	31	53.22	96	43.144	34	68.28	242	6.372	16
Mar. 2.0	4.422	74	35.82	152	19.527	62	52.43	79	43.222	78	65.66	262	6.426	54
12.0	4.531	109	34.11	171	19.623	96	51.85	58	43.346	124	62.92	274	6.520	94
21.9	4.675	144	32.25	186	19.755	132	51.55	30	43.517	171	60.11	281	6.657	137
31.9	4.856	181	30.26	199	19.922	167	51.54	1	43.734	217	57.27	284	6.836	179
Apr. 10.9	5.073	217	28.16	210	20.124	202	51.87	33	43.996	262	54.47	280	7.055	219
20.9	5.324	251	26.00	216	20.358	234	52.54	67	44.299	303	51.76	271	7.312	257
30.8	5.605	281	23.82	218	20.622	264	53.53	99	44.641	342	49.20	256	7.600	288
May 10.8	5.912	307	21.67	215	20.909	287	54.85	132	45.015	374	46.83	237	7.915	315
20.8	6.239	327	19.60	207	21.215	306	56.45	160	45.414	399	44.73	210	8.248	333
30.8	6.578	339	17.65	195	21.530	315	58.29	184	45.829	415	42.93	180	8.592	344
June 9.7	6.923	345	15.87	178	21.849	319	60.31	202	46.250	421	41.46	147	8.937	345
19.7	7.264	341	14.33	154	22.163	314	62.49	218	46.668	418	40.38	108	9.275	338
29.7	7.594	330	13.04	129	22.462	299	64.74	225	47.071	403	39.71	67	9.597	322
July 9.6	7.902	308	12.03	101	22.742	280	67.01	227	47.450	379	39.47	24	9.894	297
19.6	8.182	280	11.34	69	22.993	251	69.25	224	47.794	344	39.64	17	10.159	265
29.6	8.426	244	10.98	36	23.210	217	71.40	215	48.094	300	40.22	58	10.387	228
Aug. 8.6	8.628	202	10.93	5	23.389	179	73.44	204	48.341	247	41.17	95	10.574	187
18.5	8.785	157	11.19	26	23.528	139	75.31	187	48.530	189	42.48	131	10.716	142
28.5	8.893	108	11.71	52	23.624	96	76.98	167	48.659	129	44.08	160	10.811	95
Sept. 7.5	8.953	60	12.49	78	23.677	53	78.44	146	48.725	66	45.88	180	10.860	49
17.5	8.966	13	13.46	97	23.690	13	79.67	123	48.727	2	47.83	195	10.866	6
27.4	8.935	31	14.58	112	23.666	24	80.66	99	48.672	55	49.84	201	10.832	34
Oct. 7.4	8.865	70	15.77	119	23.611	55	81.40	74	48.565	107	51.83	199	10.762	70
17.4	8.764	101	16.97	120	23.529	82	81.91	51	48.414	151	53.70	187	10.664	98
27.3	8.638	126	18.13	116	23.427	102	82.17	26	48.229	185	55.36	166	10.541	123
Nov. 6.3	8.497	141	19.19	106	23.310	117	82.22	5	48.018	211	56.76	140	10.402	139
16.3	8.348	149	20.11	92	23.188	122	82.03	19	47.794	224	57.82	106	10.253	149
26.3	8.198	150	20.83	72	23.063	125	81.65	38	47.568	226	58.50	68	10.099	154
Dec. 6.2	8.054	144	21.34	51	22.941	122	81.08	57	47.348	220	58.76	26	9.947	152
16.2	7.922	132	21.60	26	22.829	112	80.32	76	47.145	203	58.60	16	9.802	145
26.2	7.808	114	21.63	3	22.729	100	79.43	89	46.965	180	58.02	58	9.668	134
36.2	7.715	93	21.39	24	22.645	84	78.41	102	46.814	151	57.03	99	9.551	117
Mean Place	4.046		37.50		19.326		51.67		43.040		68.97		6.566	
Sec δ, Tan δ	1.127		−0.520		1.017		+0.184		1.475		−1.084		1.152	
$D_\psi \alpha$, $D_\omega \alpha$	+0.07		+0.03		+0.06		−0.01		+0.07		+0.07		+0.06	
$D_\psi \delta$, $D_\omega \delta$	+0.4		−0.4		+0.4		−0.4		+0.4		−0.4		+0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

λ Pegasi. Mag. 4.1				ε Gruis. Mag. 3.7				τ Aquarii. Mag. 4.2				μ Pegasi. Mag. 3.7			
Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.		Right Ascension.		Declination.	
h m 22 42		° ′ +23 7		h m 22 43		° ′ −51 44		h m 22 45		° ′ −14 1		h m 22 45		° ′ +24 9	
s		″		s		″		s		″		s		″	
32.038	90	53.67	138	33.185	155	82.36	138	12.378	68	51.86	18	59.914	94	58.15	138
31.948	68	52.29	154	33.030	116	80.98	177	12.310	48	52.04	3	59.820	72	56.77	155
31.880	44	50.75	166	32.914	74	79.21	212	12.262	24	52.07	13	59.748	48	55.22	168
31.836	14	49.09	168	32.840	27	77.09	241	12.238	1	51.94	33	59.700	18	53.54	170
31.822	18	47.41	162	32.813	20	74.68	265	12.239	30	51.61	51	59.682	15	51.84	166
31.840	53	45.79	151	32.833	70	72.03	282	12.269	60	51.10	72	59.697	48	50.18	155
31.893	90	44.28	129	32.903	120	69.21	294	12.329	91	50.38	92	59.745	88	48.63	136
31.983	130	42.99	103	33.023	171	66.27	301	12.420	128	49.46	114	59.833	127	47.27	108
32.113	169	41.96	69	33.194	222	63.26	301	12.548	161	48.32	133	59.960	167	46.19	75
32.282	208	41.27	31	33.416	272	60.25	296	12.709	196	46.99	153	60.127	206	45.44	39
32.490	243	40.96	9	33.688	317	57.29	285	12.905	228	45.46	171	60.333	241	45.05	3
32.733	274	41.05	50	34.005	360	54.44	267	13.133	260	43.75	183	60.574	273	45.08	45
33.007	300	41.55	91	34.365	396	51.77	244	13.393	283	41.92	194	60.847	300	45.53	85
33.307	319	42.46	130	34.761	422	49.33	215	13.676	304	39.98	200	61.147	319	46.38	126
33.626	330	43.76	166	35.183	442	47.18	181	13.980	318	37.98	200	61.466	332	47.64	162
33.956	333	45.42	195	35.625	451	45.37	144	14.298	323	35.98	196	61.798	335	49.26	192
34.289	327	47.37	222	36.076	448	43.93	102	14.621	321	34.02	186	62.133	330	51.18	220
34.616	312	49.59	241	36.524	435	42.91	59	14.942	310	32.16	171	62.463	316	53.38	240
34.928	291	52.00	256	36.959	408	42.32	14	15.252	293	30.45	153	62.779	294	55.78	256
35.219	261	54.56	261	37.367	373	42.18	31	15.545	265	28.92	133	63.073	265	58.34	264
35.480	226	57.17	263	37.740	326	42.49	73	15.810	234	27.59	105	63.338	231	60.98	265
35.706	187	59.80	258	38.066	271	43.22	114	16.044	195	26.54	80	63.569	191	63.63	261
35.893	144	62.38	249	38.337	210	44.36	148	16.239	155	25.74	54	63.760	147	66.24	253
36.037	100	64.87	235	38.547	143	45.84	179	16.394	110	25.20	26	63.907	103	68.77	240
36.137	55	67.22	215	38.690	75	47.63	200	16.504	66	24.94	2	64.010	60	71.17	222
36.192	14	69.37	194	38.765	6	49.63	216	16.570	24	24.92	22	64.070	17	73.39	199
36.206	25	71.31	169	38.771	57	51.79	220	16.594	15	25.14	40	64.087	21	75.38	175
36.181	59	73.00	143	38.714	115	53.99	215	16.579	50	25.54	55	64.066	55	77.13	149
36.122	86	74.43	113	38.599	165	56.14	203	16.529	80	26.09	67	64.011	85	78.62	118
36.036	110	75.56	83	38.434	206	58.17	180	16.449	101	26.76	75	63.926	107	79.80	90
35.926	124	76.39	52	38.228	234	59.97	149	16.348	118	27.51	76	63.819	125	80.70	57
35.802	134	76.91	20	37.994	251	61.46	113	16.230	125	28.27	75	63.694	134	81.27	24
35.668	139	77.11	13	37.743	257	62.59	71	16.105	127	29.02	70	63.560	139	81.51	9
35.529	137	76.98	43	37.486	252	63.30	26	15.978	123	29.72	63	63.421	138	81.42	40
35.392	130	76.55	74	37.234	236	63.56	20	15.855	113	30.35	54	63.283	133	81.02	71
35.262	119	75.81	102	36.998	212	63.36	67	15.742	102	30.89	42	63.150	121	80.31	100
35.143	104	74.79	127	36.786	181	62.69	111	15.640	84	31.31	27	63.029	107	79.31	127
35.039		73.52		36.605		61.58		15.556		31.58		62.922		78.04	
31.883		42.77		32.835		72.77		11.957		51.42		59.749		46.83	
1.087		*+0.427*		*1.615*		*−1.269*		1.031		−0.250		1.096		+0.449	
+0.06		*−0.03*		*+0.07*		*+0.08*		+0.06		+0.02		+0.06		−0.03	
+0.4		*−0.3*		*+0.4*		*−0.3*		+0.4		−0.3		+0.4		−0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	ι Cephei. Mag. 3.7 Right Ascension.		ι Cephei. Declination.		λ Aquarii. Mag. 3.8 Right Ascension.		λ Aquarii. Declination.		ρ Indi. Mag. 6.1 Right Ascension.		ρ Indi. Declination.		δ Aquarii. Mag. 3.[illegible] Right Ascension.		δ Aquarii. Declination.
	h m		° ′		h m		° ′		h m		° ′		h m		° ′
	22 46		+65 45		22 48		− 8 0		22 48		−70 30		22 50		−[illegible]
	s		″		s		″		s		″		s		″
Jan. 1.2	42.05	36	70.14	166	17.530	69	76.29	41	53.93	39	75.09	204	15.260	73	[illegible]
11.1	41.69	31	68.48	214	17.461	50	76.70	31	53.54	31	73.05	250	15.187	54	[illegible]
21.1	41.38	26	66.34	254	17.411	27	77.01	18	53.23	22	70.55	287	15.133	30	[illegible]
31.1	41.12	17	63.80	282	17.384	3	77.19	3	53.01	13	67.68	318	15.103	5	[illegible]
Feb. 10.1	40.95	9	60.98	299	17.381	26	77.22	15	52.88	4	64.50	339	15.098	24	[illegible]
20.0	40.86	0	57.99	304	17.407	56	77.07	34	52.84	5	61.11	356	15.122	54	[illegible]
Mar. 2.0	40.86	10	54.95	297	17.463	87	76.73	55	52.89	15	57.55	361	15.176	88	[illegible]
12.0	40.96	21	51.98	276	17.550	122	76.18	79	53.04	26	53.94	359	15.264	122	[illegible]
22.0	41.17	29	49.22	245	17.672	157	75.39	102	53.30	34	50.35	350	15.386	158	[illegible]
31.9	41.46	38	46.77	204	17.829	190	74.37	126	53.64	43	46.85	335	15.544	192	[illegible]
Apr. 10.9	41.84	46	44.73	155	18.019	224	73.11	145	54.07	51	43.50	311	15.736	227	[illegible]
20.9	42.30	52	43.18	102	18.243	254	71.66	166	54.58	59	40.39	283	15.963	257	[illegible]
30.8	42.82	56	42.16	43	18.497	280	70.00	181	55.17	65	37.56	246	16.220	283	[illegible]
May 10.8	43.38	60	41.73	16	18.777	300	68.19	192	55.82	69	35.10	206	16.503	306	[illegible]
20.8	43.98	61	41.89	74	19.077	313	66.27	198	56.51	73	33.04	161	16.809	319	[illegible]
30.8	44.59	61	42.63	130	19.390	319	64.29	201	57.24	75	31.43	112	17.128	326	[illegible]
June 9.7	45.20	59	43.93	183	19.709	317	62.28	196	57.99	74	30.31	61	17.454	324	[illegible]
19.7	45.79	56	45.76	231	20.026	305	60.32	188	58.73	72	29.70	9	17.778	315	[illegible]
29.7	46.35	50	48.07	272	20.331	289	58.44	175	59.45	67	29.61	45	18.093	296	[illegible]
July 9.7	46.85	45	50.79	308	20.620	262	56.69	156	60.12	62	30.06	94	18.389	271	21.77
19.6	47.30	37	53.87	334	20.882	232	55.13	136	60.74	54	31.00	142	18.660	240	20.53
29.6	47.67	30	57.21	356	21.114	194	53.77	112	61.28	45	32.42	184	18.900	201	19.55
Aug. 8.6	47.97	21	60.77	367	21.308	153	52.65	88	61.73	34	34.26	220	19.101	160	[illegible]
18.5	48.18	12	64.44	372	21.461	111	51.77	62	62.07	22	36.46	248	19.261	116	18.44
28.5	48.30	4	68.16	370	21.572	68	51.15	39	62.29	10	38.94	267	19.377	72	18.30
Sept. 7.5	48.34	4	71.86	359	21.640	27	50.76	14	62.39	1	41.61	276	19.449	28	18.41
17.5	48.30	12	75.45	341	21.667	12	50.62	6	62.38	15	44.37	274	19.477	12	18.76
27.4	48.18	19	78.86	316	21.655	45	50.68	25	62.23	26	47.11	261	19.465	46	19.30
Oct. 7.4	47.99	27	82.02	286	21.610	74	50.93	39	61.97	35	49.72	238	19.419	77	[illegible]
17.4	47.72	32	84.88	246	21.536	94	51.32	50	61.62	43	52.10	203	19.342	100	20.77
27.4	47.40	36	87.34	201	21.442	110	51.82	58	61.19	50	54.13	161	19.242	117	21.61
Nov. 6.3	47.04	40	89.35	152	21.332	120	52.40	63	60.69	54	55.74	111	19.125	125	22.45
16.3	46.64	43	90.87	96	21.212	122	53.03	65	60.15	56	56.85	56	19.000	129	23.26
26.3	46.21	44	91.83	40	21.090	117	53.68	63	59.59	57	57.41	3	18.871	125	24.00
Dec. 6.2	45.77	44	92.23	20	20.973	111	54.31	61	59.02	53	57.38	60	18.746	117	24.65
16.2	45.33	42	92.03	79	20.862	99	54.92	56	58.49	50	56.78	118	18.629	105	25.17
26.2	44.91	40	91.24	135	20.763	84	55.48	49	57.99	44	55.60	173	18.524	89	25.56
36.2	44.51		89.89		20.679		55.97		57.55		53.87		18.435		25.73
Mean Place	43.309		48.98		17.113		77.70		53.950		63.03		14.807		45.11
Sec δ, Tan δ	2.436		+2.222		1.010		−0.141		2.998		−2.826		1.042		[illegible]
$D_\psi \alpha$, $D_\omega \alpha$	+0.04		−0.11		+0.06		+0.01		+0.08		+0.18		+0.06		+0.02
$D_\psi \delta$, $D_\omega \delta$	+0.1		−0.3		+0.4		−0.3		+0.4		−0.3		+0.4		−0.3

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	55 Pegasi. Mag. 4.7 Right Ascension.		Declination.		c^2 Aquarii. Mag. 3.8 Right Ascension.		Declination.	
	h m 23 2		° ′ + 8 57		h m 23 5		° ′ −21 36	
	s		″		s		″	
Jan. 1.2	49.746	82	46.07	93	1.916	89	86.19	5
11.2	49.664	65	45.14	99	1.827	68	86.14	29
21.1	49.599	45	44.15	98	1.759	46	85.85	51
31.1	49.554	20	43.17	94	1.713	21	85.34	74
Feb. 10.1	49.534	6	42.23	84	1.692	7	84.60	96
20.0	49.540	37	41.39	67	1.699	39	83.64	119
Mar. 2.0	49.577	71	40.72	48	1.738	73	82.45	140
12.0	49.648	104	40.24	22	1.811	108	81.05	161
22.0	49.752	144	40.02	5	1.919	144	79.44	178
31.9	49.896	180	40.07	36	2.063	183	77.66	193
Apr. 10.9	50.076	215	40.43	68	2.246	218	75.73	206
20.9	50.291	247	41.11	99	2.464	252	73.67	215
30.9	50.538	274	42.10	130	2.716	280	71.52	219
May 10.8	50.812	297	43.40	157	2.996	306	69.33	218
20.8	51.109	311	44.97	179	3.302	322	67.15	210
30.8	51.420	318	46.76	197	3.624	331	65.05	200
June 9.7	51.738	318	48.73	212	3.955	333	63.05	184
19.7	52.056	307	50.85	219	4.288	327	61.21	162
29.7	52.363	292	53.04	220	4.615	310	59.59	138
July 9.7	52.655	267	55.24	218	4.925	287	58.21	108
19.6	52.922	238	57.42	209	5.212	255	57.13	78
29.6	53.160	202	59.51	197	5.467	219	56.35	48
Aug. 8.6	53.362	162	61.48	181	5.686	178	55.87	15
18.6	53.524	121	63.29	160	5.864	133	55.72	15
28.5	53.645	80	64.89	140	5.997	88	55.87	41
Sept. 7.5	53.725	40	66.29	116	6.085	44	56.28	66
17.5	53.765	3	67.45	94	6.129	2	56.94	84
27.4	53.768	32	68.39	68	6.131	37	57.78	99
Oct. 7.4	53.736	60	69.07	47	6.094	69	58.77	107
17.4	53.676	83	69.54	23	6.025	95	59.84	109
27.4	53.593	99	69.77	3	5.930	115	60.93	107
Nov. 6.3	53.494	111	69.80	17	5.815	126	62.00	99
16.3	53.383	116	69.63	36	5.689	133	62.99	87
26.3	53.267	117	69.27	53	5.556	132	63.86	71
Dec. 6.3	53.150	113	68.74	68	5.424	126	64.57	53
16.2	53.037	106	68.06	81	5.298	116	65.10	31
26.2	52.931	94	67.25	91	5.182	102	65.41	10
36.2	52.837		66.34		5.080		65.51	
Mean Place	49.342		38.97		1.376		83.65	
Sec δ, Tan δ	1.012		+0.158		1.076		−0.396	
$D_\psi a$, $D_\omega a$	+0.06		−0.01		+0.06		+0.03	
$D_\psi \delta$, $D_\omega \delta$	+0.4		−0.2		+0.4		−0.2	

Washington Mean Time.	π Cephei. Mag. 4.6 Right Ascension.		Declination.		ι Gru Mag. Right Ascension.	
	h m 23 5		° ′ +74 56		h m 23 5	
	s		″		s	
Jan. 1.2	13.10	68	42.50	132	40.447	149
11.2	12.42	60	41.18	187	40.298	118
21.1	11.82	50	39.31	233	40.180	85
31.1	11.32	39	36.98	271	40.095	49
Feb. 10.1	10.93	24	34.27	296	40.046	9
20.0	10.69	10	31.31	311	40.037	34
Mar. 2.0	10.59	6	28.20	311	40.071	78
12.0	10.65	22	25.09	298	40.149	125
22.0	10.87	36	22.11	275	40.274	171
31.9	11.23	51	19.36	240	40.445	218
Apr. 10.9	11.74	65	16.96	196	40.663	263
20.9	12.39	74	15.00	145	40.926	304
30.9	13.13	82	13.55	88	41.230	341
May 10.8	13.95	88	12.67	31	41.571	370
20.8	14.83	91	12.36	28	41.941	393
30.8	15.74	92	12.64	87	42.334	405
June 9.7	16.66	89	13.51	144	42.739	408
19.7	17.55	85	14.95	195	43.147	401
29.7	18.40	78	16.90	242	43.548	383
July 9.7	19.18	68	19.32	282	43.931	355
19.6	19.86	60	22.14	318	44.286	317
29.6	20.46	48	25.32	345	44.603	271
Aug. 8.6	20.94	36	28.77	364	44.874	219
18.6	21.30	24	32.41	377	45.093	162
28.5	21.54	9	36.18	381	45.255	102
Sept. 7.5	21.63	2	39.99	378	45.357	41
17.5	21.61	15	43.77	366	45.398	16
27.4	21.46	28	47.43	348	45.382	69
Oct. 7.4	21.18	37	50.91	322	45.313	115
17.4	20.81	48	54.13	287	45.198	154
27.4	20.33	56	57.00	246	45.044	182
Nov. 6.3	19.77	64	59.46	199	44.862	202
16.3	19.13	69	61.45	144	44.660	213
26.3	18.44	74	62.89	87	44.447	211
Dec. 6.3	17.70	75	63.76	26	44.236	205
16.2	16.95	74	64.02	36	44.031	190
26.2	16.21	71	63.66	97	43.841	167
36.2	15.50		62.69		43.674	
Mean Place	15.234		19.07		39.922	
Sec δ, Tan δ	3.850		+3.718		1.432	
$D_\psi a$, $D_\omega a$	+0.04		−0.24		+0.07	
$D_\psi \delta$, $D_\omega \delta$	+0.4		−0.2		+0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

...gton ...me.	59 Pegasi. Mag. 5.2 Right Ascension.		Declination.		δ H[1]. Cassiopeiæ. Mag. 5.6 Right Ascension.		Declination.		φ Aquarii. Mag. 4.4 Right Ascension.		Declination.		ψ[2] Aquarii. Mag. 4.5 Right Ascension.		Declination.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	23 7		+ 8 16		23 9		+56 42		23 10		− 6 29		23 11		− 9 31	
	s		″		s		″		s		″		s		″	
1.2	33.156	84	16.17	91	16.539	252	56.74	145	1.974	81	45.88	47	33.208	82	82.75	39
11.2	33.072	67	15.26	94	16.287	221	55.29	189	1.893	67	46.35	38	33.126	65	83.14	24
21.1	33.005	49	14.32	95	16.066	181	53.40	227	1.826	44	46.73	26	33.061	46	83.38	11
31.1	32.956	24	13.37	89	15.885	131	51.13	256	1.782	22	46.99	12	33.015	23	83.49	6
10.1	32.932	1	12.48	79	15.754	73	48.57	273	1.760	2	47.11	6	32.992	2	83.43	25
20.0	32.933	33	11.69	63	15.681	6	45.84	279	1.762	33	47.05	26	32.994	33	83.18	44
2.0	32.966	66	11.06	43	15.675	62	43.05	274	1.795	66	46.79	49	33.027	65	82.74	67
12.0	33.032	102	10.63	19	15.737	136	40.31	255	1.861	98	46.30	69	33.092	97	82.07	89
22.0	33.134	137	10.44	10	15.873	206	37.76	228	1.959	135	45.61	95	33.189	135	81.18	113
31.9	33.271	176	10.54	38	16.079	276	35.48	191	2.094	171	44.66	118	33.324	172	80.05	134
10.9	33.447	211	10.92	71	16.355	339	33.57	146	2.265	208	43.48	141	33.496	206	78.71	155
20.9	33.658	243	11.63	102	16.694	393	32.11	94	2.473	239	42.07	163	33.702	238	77.16	173
30.9	33.901	271	12.65	130	17.087	438	31.17	41	2.712	267	40.44	176	33.940	269	75.43	188
10.8	34.172	294	13.95	158	17.525	470	30.76	15	2.979	291	38.68	190	34.209	291	73.55	198
20.8	34.466	310	15.53	179	17.995	491	30.91	70	3.270	307	36.78	201	34.500	309	71.57	204
30.8	34.776	318	17.32	196	18.486	497	31.61	123	3.577	317	34.77	203	34.809	318	69.53	204
9.7	35.094	318	19.28	211	18.983	490	32.84	174	3.894	318	32.74	202	35.127	320	67.49	200
19.7	35.412	309	21.39	218	19.473	469	34.58	219	4.212	312	30.72	194	35.447	315	65.49	191
29.7	35.721	294	23.57	220	19.942	439	36.77	258	4.524	295	28.78	182	35.762	299	63.58	176
9.7	36.015	269	25.77	215	20.381	397	39.35	292	4.819	273	26.96	166	36.061	278	61.82	156
19.6	36.284	241	27.92	206	20.778	348	42.27	318	5.092	246	25.30	149	36.339	248	60.26	135
29.6	36.525	205	29.98	194	21.126	291	45.45	336	5.338	209	23.81	124	36.587	214	58.91	110
8.6	36.730	167	31.92	177	21.417	230	48.81	350	5.547	172	22.57	98	36.801	176	57.81	85
18.6	36.897	126	33.69	157	21.647	165	52.31	354	5.719	133	21.59	75	36.977	134	56.96	56
28.5	37.023	85	35.26	136	21.812	100	55.85	350	5.852	88	20.84	45	37.111	93	56.40	30
t. 7.5	37.108	45	36.62	112	21.912	36	59.35	342	5.940	50	20.39	25	37.204	51	56.10	7
17.5	37.153	7	37.74	90	21.948	25	62.77	325	5.990	9	20.14	3	37.255	11	56.03	17
27.4	37.160	27	38.64	65	21.923	81	66.02	302	5.999	23	20.11	19	37.266	24	56.20	35
7.4	37.133	55	39.29	43	21.842	133	69.04	274	5.976	55	20.30	37	37.242	53	56.55	50
17.4	37.078	79	39.72	21	21.709	178	71.78	237	5.921	77	20.67	49	37.189	79	57.05	62
27.4	36.999	96	39.93	1	21.531	216	74.15	196	5.844	99	21.16	56	37.110	96	57.67	70
6.3	36.903	108	39.94	20	21.315	245	76.11	151	5.745	108	21.72	64	37.014	109	58.37	73
16.3	36.795	114	39.74	36	21.070	269	77.62	100	5.637	113	22.36	67	36.905	116	59.10	73
26.3	36.681	116	39.38	52	20.801	281	78.62	47	5.524	116	23.03	68	36.789	116	59.83	69
6.3	36.565	113	38.86	68	20.520	287	79.09	8	5.408	113	23.71	67	36.673	113	60.52	65
16.2	36.452	105	38.18	79	20.233	282	79.01	63	5.295	103	24.38	63	36.560	105	61.17	57
26.2	36.347	95	37.39	88	19.951	269	78.38	115	5.192	94	25.01	56	36.455	94	61.74	48
36.2	36.252		36.51		19.682		77.23		5.098		25.57		36.361		62.22	
Place	32.720		9.18		16.897		35.99		1.450		48.06		32.666		83.99	
Tan δ	1.011		+0.145		1.822		+1.523		1.006		−0.114		1.014		−0.168	
$D_\psi\alpha$	+0.06		−0.01		+0.05		−0.10		+0.06		+0.01		+0.06		−0.01	
$D_\psi\delta$	+0.4		−0.2		+0.4		−0.2		+0.4		−0.2		+0.4		−0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	γ Tucanæ. Mag. 4.1 Right Ascension.		Declination.		γ Piscium. Mag. 3.8 Right Ascension.		Declination.		γ Sculptoris. Mag. 4.5 Right Ascension.		Declination.		o Cephei Mag. 4. Right Ascension.		D
	h m		° ′		h m		° ′		h m		° ′		h m		
	23 12		−58 40		23 12		+ 2 49		23 14		−32 58		23 15		
	s		″		s		″		s		″		s		
Jan. 1.2	36.035		99.83		52.229		48.24		21.281		69.56		11.75		4
11.2	35.791	244	98.44	139	52.147	82	47.49	75	21.168	113	69.14	42	11.32	43	4
21.1	35.588	203	96.59	185	52.081	66	46.75	74	21.075	93	68.39	75	10.93	39	4
31.1	35.431	157	94.33	226	52.033	48	46.07	68	21.008	67	67.34	105	10.60	33	4
Feb. 10.1	35.326	105	91.72	261	52.008	25	45.47	60	20.967	41	66.00	134	10.35	25	4
20.1	35.277	49	88.84	288	52.008	0	44.99	48	20.959	8	64.39	161	10.19	16	3
Mar. 2.0	35.285	8	85.72	312	52.038	30	44.70	29	20.985	26	62.55	184	10.12	7	3
12.0	35.354	69	82.46	326	52.100	62	44.59	11	21.048	63	60.49	206	10.16	4	3
22.0	35.485	131	79.12	334	52.197	97	44.74	15	21.150	102	58.26	223	10.30	14	2
31.9	35.680	195	75.77	335	52.331	134	45.14	40	21.291	141	55.89	237	10.55	25	2
Apr. 10.9	35.935	255	72.46	331	52.501	170	45.83	69	21.474	183	53.43	246	10.90	35	2
20.9	36.249	314	69.28	318	52.707	206	46.78	95	21.697	223	50.91	252	11.34	44	2
30.9	36.617	368	66.29	299	52.945	238	48.02	124	21.957	260	48.39	252	11.85	51	2
May 10.8	37.033	416	63.55	274	53.213	268	49.50	148	22.251	294	45.92	247	12.43	58	2
20.8	37.490	457	61.12	243	53.503	290	51.20	170	22.571	320	43.56	236	13.06	63	2
30.8	37.977	487	59.06	206	53.812	309	53.08	188	22.912	341	41.37	219	13.71	65	2
June 9.8	38.482	505	57.42	164	54.128	316	55.08	200	23.267	355	39.38	199	14.37	66	2
19.7	38.993	511	56.23	119	54.447	319	57.15	207	23.625	358	37.67	171	15.02	65	2
29.7	39.498	505	55.52	71	54.758	311	59.26	211	23.976	351	36.26	141	15.65	63	2
July 9.7	39.981	483	55.30	22	55.054	296	61.32	206	24.314	338	35.20	106	16.23	58	27
19.6	40.431	450	55.59	29	55.328	274	63.31	199	24.628	314	34.51	69	16.76	53	29
29.6	40.835	404	56.36	77	55.573	245	65.18	187	24.911	283	34.19	32	17.22	46	33
Aug. 8.6	41.181	346	57.58	122	55.784	211	66.86	168	25.155	244	34.24	5	17.61	39	36
18.6	41.460	279	59.21	163	55.958	174	68.36	150	25.355	200	34.66	42	17.90	29	40
28.5	41.666	206	61.19	198	56.090	132	69.63	127	25.507	152	35.42	76	18.11	21	43
Sept. 7.5	41.793	127	63.45	226	56.183	93	70.67	104	25.610	103	36.47	105	18.23	12	47
17.5	41.840	47	65.88	243	56.235	52	71.47	80	25.663	53	37.76	129	18.27	4	51
27.5	41.810	30	68.40	252	56.249	14	72.05	58	25.669	6	39.22	146	18.22	5	54
Oct. 7.4	41.706	104	70.90	250	56.229	20	72.40	35	25.631	38	40.79	157	18.08	14	58
17.4	41.537	169	73.29	239	56.180	49	72.54	14	25.555	76	42.39	160	17.86	22	61
27.4	41.312	225	75.45	216	56.107	73	72.49	5	25.447	108	43.95	156	17.58	28	64
Nov. 6.3	41.042	270	77.30	185	56.016	91	72.27	22	25.316	131	45.39	144	17.24	34	66
16.3	40.741	301	78.75	145	55.913	103	71.91	36	25.169	147	46.65	126	16.85	39	68
26.3	40.423	318	79.75	100	55.804	109	71.43	48	25.013	156	47.68	103	16.42	43	69
Dec. 6.3	40.099	324	80.25	50	55.692	112	70.84	59	24.855	158	48.43	75	15.96	46	70
16.2	39.783	316	80.22	3	55.583	109	70.18	66	24.701	154	48.89	46	15.49	47	70
26.2	39.486	297	79.66	56	55.480	103	69.44	74	24.557	144	49.01	12	15.02	47	70
36.2	39.216	270	78.60	106	55.386	94	68.68	76	24.429	128	48.80	21	14.57	45	69
Mean Place	35.551		88.76		51.731		42.94		20.684		63.88		12.670		2
Sec δ, Tan δ	1.924		−1.644		1.001		+0.049		1.192		−0.649		2.631		+
$D_\psi a$, $D_\omega a$	+0.07		+0.11		+0.06		0.00		+0.06		+0.04		+0.05		-
$D_\psi \delta$, $D_\omega \delta$	+0.4		−0.2		+0.4		−0.2		+0.4		−0.2		+0.4		

FOR THE UPPER TRANSIT AT WASHINGTON.

hington n Time.	*τ* Pegasi. Mag. 4.6 Right Ascension.		Declination.		*b*¹ Aquarii. Mag. 4.2 Right Ascension.		Declination.		4 Cassiopeiæ. Mag. 5.2 Right Ascension.		Declination.		*υ* Pegasi. Mag. 4.6 Right Ascension.		Declination.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	23 16		+23 17		23 18		−20 32		23 21		+61 49		23 21		+22 56	
	s		″		s		″		s		″		s		″	
a. 1.2	31.962		20.96		37.369		76.21		8.16		59.47		14.478		61.05	
11.2	31.856	106	19.77	119	37.274	95	76.25	4	7.84	32	58.19	128	14.371	107	59.90	115
21.1	31.764	92	18.40	137	37.197	77	76.05	20	7.54	30	56.41	178	14.278	93	58.57	133
31.1	31.694	70	16.91	149	37.139	58	75.63	42	7.29	25	54.20	221	14.206	72	57.11	146
b. 10.1	31.647	47	15.35	156	37.105	34	74.97	66	7.09	20	51.66	254	14.156	50	55.59	152
20.1	31.631	16	13.80	155	37.098	7	74.09	88	6.96	13	48.90	276	14.136	20	54.08	151
r. 2.0	31.648	17	12.34	146	37.122	24	72.96	113	6.91	5	46.02	288	14.150	14	52.65	143
12.0	31.703	55	11.04	130	37.179	57	71.63	133	6.94	3	43.15	287	14.199	49	51.39	126
22.0	31.796	93	9.98	106	37.270	91	70.08	155	7.06	12	40.40	275	14.288	89	50.34	105
31.9	31.932	136	9.21	77	37.400	130	68.34	174	7.26	20	37.91	249	14.419	131	49.58	76
pr. 10.9	32.109	177	8.76	45	37.568	168	66.43	191	7.55	29	35.75	216	14.591	172	49.14	44
20.9	32.326	217	8.70	6	37.772	204	64.38	205	7.90	35	34.02	173	14.804	213	49.08	6
30.9	32.580	254	9.04	34	38.010	238	62.23	215	8.32	42	32.78	124	15.054	250	49.41	33
ay 10.8	32.863	283	9.77	73	38.280	270	60.03	220	8.80	48	32.07	71	15.334	280	50.13	72
20.8	33.172	309	10.88	111	38.577	297	57.82	221	9.32	52	31.92	15	15.641	307	51.23	110
30.8	33.498	326	12.34	146	38.891	314	55.66	216	9.86	54	32.34	42	15.965	324	52.66	143
ne 9.8	33.833	335	14.12	178	39.218	327	53.60	206	10.42	56	33.32	98	16.299	334	54.41	175
19.7	34.168	335	16.17	205	39.549	331	51.69	191	10.97	55	34.82	150	16.634	335	56.44	203
29.7	34.495	327	18.42	225	39.875	326	49.98	171	11.50	53	36.80	198	16.962	328	58.68	224
ly 9.7	34.804	309	20.84	242	40.187	312	48.51	147	12.00	50	39.22	242	17.273	311	61.06	238
19.6	35.091	287	23.35	251	40.479	292	47.32	119	12.45	45	42.00	278	17.562	289	63.54	248
29.6	35.345	254	25.89	254	40.742	263	46.42	90	12.85	40	45.10	310	17.820	258	66.07	253
g. 8.6	35.563	218	28.42	253	40.971	229	45.85	57	13.19	34	48.43	333	18.043	223	68.58	251
18.6	35.742	179	30.88	246	41.160	189	45.60	25	13.46	27	51.94	351	18.227	184	71.01	243
28.5	35.878	136	33.22	234	41.306	146	45.65	5	13.65	19	55.53	359	18.370	143	73.33	232
pt. 7.5	35.973	95	35.39	217	41.407	101	46.00	35	13.78	13	59.14	361	18.469	99	75.48	215
17.5	36.025	52	37.37	198	41.464	57	46.59	59	13.83	5	62.68	354	18.527	58	77.45	197
27.5	36.038	13	39.13	176	41.480	16	47.40	81	13.81	2	66.11	343	18.546	19	79.19	174
t. 7.4	36.015	23	40.63	150	41.457	23	48.36	96	13.73	8	69.35	324	18.528	18	80.69	150
17.4	35.962	53	41.87	124	41.401	56	49.43	107	13.58	15	72.31	296	18.480	48	81.92	123
27.4	35.882	80	42.83	96	41.317	84	50.54	111	13.38	20	74.93	262	18.405	75	82.88	96
v. 6.3	35.782	100	43.49	66	41.213	104	51.64	110	13.12	26	77.17	224	18.310	95	83.53	65
16.3	35.667	115	43.85	36	41.093	120	52.68	104	12.83	29	78.95	178	18.199	111	83.90	37
26.3	35.542	125	43.91	6	40.966	127	53.62	94	12.51	32	80.23	128	18.077	122	83.97	7
c. 6.3	35.413	129	43.66	25	40.837	129	54.41	79	12.17	34	80.97	74	17.950	127	83.74	23
16.2	35.283	130	43.13	53	40.711	126	55.01	60	11.81	36	81.14	17	17.822	128	83.23	51
26.2	35.158	125	42.31	82	40.593	118	55.43	42	11.46	35	80.74	40	17.697	125	82.44	79
36.2	35.042	116	41.23	108	40.485	108	55.61	18	11.11	35	79.76	98	17.581	116	81.42	102
n Place	31.586		8.86		36.761		74.07		8.592		37.20		14.067		48.93	
δ, Tan δ	1.089		+0.430		1.068		−0.375		2.118		+1.868		1.086		+0.423	
$D_\omega \alpha$	+0.06		−0.03		+0.06		+0.02		+0.05		−0.12		+0.06		−0.03	
$D_\omega \delta$	+0.4		−0.2		+0.4		−0.2		+0.4		−0.2		+0.4		−0.2	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	κ Piscium. Mag. 4.9 Right Ascension.		κ Piscium. Declination.		θ Piscium. Mag. 4.4 Right Ascension.		θ Piscium. Declination.		70 Pegasi. Mag. 4.7 Right Ascension.		70 Pegasi. Declination.		β Scul[ptoris] Mag[.] Right Ascension.	
	h m 23 22		° ′ + 0 48		h m 23 23		° ′ + 5 55		h m 23 24		° ′ +12 18		h m 23 28	
	s		″		s		″		s		″		s	
Jan. 1.2	41.222		8.89		45.961		29.30		57.852		17.84		32.131	
11.2	41.135	87	8.20	69	45.871	90	28.49	81	57.757	95	16.89	95	31.993	13
21.1	41.062	73	7.54	66	45.796	75	27.66	83	57.675	82	15.86	103	31.876	11
31.1	41.005	57	6.94	60	45.736	60	26.85	81	57.612	63	14.80	106	31.783	9
Feb. 10.1	40.971	34	6.45	49	45.698	38	26.11	74	57.569	43	13.75	105	31.720	6
20.1	40.961	10	6.09	36	45.686	12	25.48	63	57.553	16	12.77	98	31.689	31
Mar. 2.0	40.980	19	5.91	18	45.703	17	24.99	49	57.567	14	11.92	85	31.693	4
12.0	41.030	50	5.93	2	45.752	49	24.71	28	57.613	46	11.26	66	31.736	4
22.0	41.116	86	6.20	27	45.837	85	24.66	5	57.697	84	10.82	44	31.821	8
31.9	41.239	123	6.71	51	45.959	122	24.88	22	57.820	123	10.66	16	31.950	12
Apr. 10.9	41.399	160	7.50	79	46.119	160	25.37	49	57.982	162	10.81	15	32.123	17
20.9	41.596	197	8.56	106	46.315	196	26.17	80	58.182	200	11.27	46	32.339	21
30.9	41.826	230	9.87	131	46.545	230	27.26	109	58.416	234	12.07	80	32.596	25
May 10.8	42.087	261	11.42	155	46.807	262	28.61	135	58.682	266	13.19	112	32.890	29
20.8	42.372	285	13.16	174	47.093	286	30.21	160	58.973	291	14.60	141	33.214	32
30.8	42.676	304	15.05	189	47.398	305	32.01	180	59.283	310	16.27	167	33.564	35
June 9.8	42.991	315	17.06	201	47.713	315	33.97	196	59.603	320	18.16	189	33.929	36
19.7	43.309	318	19.13	207	48.031	318	36.05	208	59.925	322	20.23	207	34.302	37
29.7	43.621	312	21.20	207	48.344	313	38.17	212	60.242	317	22.40	217	34.673	371
July 9.7	43.919	298	23.22	202	48.642	298	40.30	213	60.545	303	24.64	224	35.031	35
19.6	44.198	279	25.15	193	48.921	279	42.37	207	60.827	282	26.88	224	35.369	33
29.6	44.449	251	26.94	179	49.172	251	44.34	197	61.080	253	29.07	219	35.675	30
Aug. 8.6	44.666	217	28.53	159	49.390	218	46.18	184	61.300	220	31.17	210	35.943	26
18.6	44.846	180	29.93	140	49.571	181	47.83	165	61.483	183	33.13	196	36.167	22
28.5	44.988	142	31.09	116	49.713	142	49.28	145	61.626	143	34.93	180	36.342	175
Sept. 7.5	45.089	101	32.01	92	49.814	101	50.49	121	61.728	102	36.51	158	36.465	123
17.5	45.149	60	32.69	68	49.875	61	51.49	100	61.790	62	37.88	137	36.535	70
27.5	45.172	23	33.14	45	49.898	23	52.24	75	61.814	24	39.01	113	36.554	19
Oct. 7.4	45.160	12	33.36	22	49.887	11	52.77	53	61.804	10	39.92	91	36.525	2
17.4	45.119	41	33.39	3	49.847	40	53.07	30	61.764	40	40.57	65	36.454	71
27.4	45.052	67	33.25	14	49.781	66	53.18	11	61.699	65	41.00	43	36.346	10
Nov. 6.3	44.968	84	32.94	31	49.697	84	53.10	8	61.615	84	41.20	20	36.210	13
16.3	44.869	99	32.51	43	49.598	99	52.84	26	61.515	100	41.19	1	36.054	15
26.3	44.762	107	31.97	54	49.491	107	52.43	41	61.406	109	40.95	24	35.884	17
Dec. 6.3	44.651	111	31.36	61	49.379	112	51.90	53	61.293	113	40.53	42	35.709	17
16.2	44.541	110	30.69	67	49.267	112	51.25	65	61.178	115	39.93	60	35.535	17
26.2	44.435	106	29.97	72	49.160	107	50.50	75	61.067	111	39.16	77	35.370	16
36.2	44.338	97	29.25	72	49.061	99	49.69	81	60.962	105	38.26	90	35.217	15
Mean Place	40.659		4.07		45.118		22.75		57.338		9.10		31.456	
Sec δ. Tan δ	1.000		+0.014		1.005		+0.104		1.024		+0.218		1.274	
$D_\psi a, D_\omega a$	+0.06		0.00		+0.06		−0.01		+0.06		−0.01		+0.06	
$D_\psi \delta, D_\omega \delta$	+0.4		−0.2		+0.4		−0.2		+0.4		−0.2		+0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

Washington Mean Time.	γ Cephei. Mag. 3.4 Right Ascension.		Declination.		κ Andromedae. Mag. 4.3 Right Ascension.		Declination.		ω^2 Aquarii. Mag. 4.6 Right Ascension.		Declination.		ι^1 Aqu Mag. Right Ascension.	
	h m 23 35		° ′ +77 10		h m 23 36		° ′ +43 52		h m 23 38		° ′ −14 59		h m 23 39	
	s		″		s		″		s		″		s	
Jan. 1.2	54.17	83	33.91	87	19.213	178	45.91	119	25.846	99	74.02	27	54.614	103
11.2	53.34	78	33.04	147	19.035	162	44.72	157	25.747	87	74.29	9	54.511	91
21.2	52.56	69	31.57	199	18.873	140	43.15	188	25.660	69	74.38	11	54.420	73
31.1	51.87	56	29.58	243	18.733	108	41.27	213	25.591	50	74.27	33	54.347	53
Feb. 10.1	51.31	41	27.15	277	18.625	70	39.14	227	25.541	25	73.94	54	54.294	27
20.1	50.90	25	24.38	300	18.555	26	36.87	231	25.516	3	73.40	78	54.267	0
Mar. 2.0	50.65	8	21.38	309	18.529	24	34.56	227	25.519	35	72.62	100	54.267	33
12.0	50.57	12	18.29	305	18.553	77	32.29	210	25.554	70	71.62	123	54.300	68
22.0	50.69	30	15.24	291	18.630	133	30.19	187	25.624	107	70.39	145	54.368	106
Apr. 1.0	50.99	48	12.33	264	18.763	189	28.32	153	25.731	145	68.94	166	54.474	145
10.9	51.47	64	9.69	227	18.952	240	26.79	114	25.876	183	67.28	183	54.619	183
20.9	52.11	78	7.42	182	19.192	288	25.65	69	26.059	221	65.45	198	54.802	221
30.9	52.89	89	5.60	131	19.480	328	24.96	22	26.280	253	63.47	210	55.023	254
May 10.8	53.78	98	4.29	75	19.808	363	24.74	27	26.533	280	61.37	216	55.277	282
20.8	54.76	104	3.54	17	20.171	385	25.01	76	26.813	304	59.21	217	55.559	305
30.8	55.80	107	3.37	41	20.556	399	25.77	122	27.117	317	57.04	213	55.864	320
June 9.8	56.87	106	3.78	99	20.955	401	26.99	166	27.434	324	54.91	204	56.184	327
19.7	57.93	102	4.77	153	21.356	393	28.65	205	27.758	323	52.87	189	56.511	327
29.7	58.95	97	6.30	203	21.749	376	30.70	237	28.081	311	50.98	170	56.838	317
July 9.7	59.92	89	8.33	249	22.125	348	33.07	266	28.392	295	49.28	147	57.155	298
19.7	60.81	79	10.82	288	22.473	313	35.73	286	28.687	268	47.81	119	57.453	274
29.6	61.60	67	13.70	321	22.786	273	38.59	303	28.955	238	46.62	91	57.727	242
Aug. 8.6	62.27	54	16.91	348	23.059	227	41.62	309	29.193	201	45.71	60	57.969	205
18.6	62.81	41	20.39	366	23.286	178	44.71	311	29.394	161	45.11	29	58.174	165
28.5	63.22	26	24.05	378	23.464	128	47.82	306	29.555	118	44.82	1	58.339	122
Sept. 7.5	63.48	11	27.83	382	23.592	78	50.88	296	29.673	77	44.81	27	58.461	79
17.5	63.59	3	31.65	378	23.670	31	53.84	280	29.750	37	45.08	49	58.540	38
27.5	63.56	18	35.43	366	23.701	15	56.64	258	29.787	1	45.57	71	58.578	0
Oct. 7.4	63.38	31	39.09	345	23.686	55	59.22	233	29.788	34	46.28	84	58.578	35
17.4	63.07	45	42.54	317	23.631	91	61.55	201	29.754	61	47.12	93	58.543	64
27.4	62.62	56	45.71	284	23.540	122	63.56	165	29.693	83	48.05	99	58.479	86
Nov. 6.4	62.06	66	48.55	239	23.418	147	65.21	127	29.610	100	49.04	98	58.393	104
16.3	61.40	75	50.94	190	23.271	168	66.48	84	29.510	111	50.02	93	58.289	117
26.3	60.65	81	52.84	134	23.103	181	67.32	40	29.399	118	50.95	84	58.172	122
Dec. 6.3	59.84	86	54.18	74	22.922	189	67.72	5	29.281	118	51.79	71	58.050	124
16.2	58.98	88	54.92	12	22.733	192	67.67	51	29.163	115	52.50	58	57.926	120
26.2	58.10	86	55.04	51	22.541	185	67.16	95	29.048	108	53.08	42	57.806	112
36.2	57.24		54.53		22.356		66.21		28.940		53.50		57.694	
Mean Place	55.858		8.83		18.934		27.14		25.143		73.76		53.896	
Sec δ, Tan δ	4.505		+4.393		1.387		+0.962		1.035		−0.268		1.056	
$D_\psi a$, $D_\omega a$	+0.05		−0.29		+0.06		−0.06		+0.06		+0.02		+0.06	
$D_\psi \delta$, $D_\omega \delta$	+0.4		−0.1		+0.4		−0.1		+0.4		−0.1		+0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

shington n Time.	ψ Andromedæ. Mag. 5.1 Right Ascension.		Declination.		41 H. Cephei. Mag. 5.0 Right Ascension.		Declination.		δ Sculptoris. Mag. 4.6 Right Ascension.		Declination.		φ Pegasi. Mag. 5.2 Right Ascension.		Declination.	
	h m		° ′		h m		° ′		h m		° ′		h m		° ′	
	23 41		+45 57		23 43		+67 20		23 44		−28 34		23 48		+18 39	
	s		″		s		″		s		″		s		″	
ı. 1.2	55.267	191	53.08	113	55.62	44	67.99	95	37.001	121	87.29	8	16.405	110	44.77	96
11.2	55.076	177	51.95	154	55.18	41	67.04	148	36.880	108	87.21	40	16.295	101	43.81	110
21.2	54.899	152	50.41	186	54.77	37	65.56	197	36.772	90	86.81	72	16.194	87	42.71	121
31.1	54.747	121	48.55	213	54.40	30	63.59	237	36.682	66	86.09	100	16.107	66	41.50	125
). 10.1	54.626	83	46.42	230	54.10	22	61.22	269	36.616	41	85.09	129	16.041	43	40.25	124
20.1	54.543	37	44.12	237	53.88	13	58.53	287	36.575	9	83.80	155	15.998	12	39.01	115
:. 2.0	54.506	14	41.75	234	53.75	3	55.66	295	36.566	26	82.25	180	15.986	22	37.86	102
12.0	54.520	70	39.41	219	53.72	8	52.71	290	36.592	63	80.45	201	16.008	60	36.84	81
22.0	54.590	128	37.22	198	53.80	18	49.81	274	36.655	103	78.44	220	16.068	101	36.03	57
r. 1.0	54.718	186	35.24	165	53.98	28	47.07	245	36.758	144	76.24	234	16.169	144	35.46	26
10.9	54.904	241	33.59	126	54.26	39	44.62	208	36.902	184	73.90	245	16.313	184	35.20	7
20.9	55.145	291	32.33	82	54.65	46	42.54	163	37.086	225	71.45	251	16.497	223	35.27	41
30.9	55.436	333	31.51	35	55.11	54	40.91	113	37.311	261	68.94	251	16.720	259	35.68	77
y 10.9	55.769	370	31.16	15	55.65	60	39.78	58	37.572	293	66.43	247	16.979	287	36.45	110
20.8	56.139	394	31.31	64	56.25	63	39.20	1	37.865	317	63.96	236	17.266	311	37.55	141
30.8	56.533	410	31.95	112	56.88	66	39.19	55	38.182	333	61.60	219	17.577	324	38.96	170
ne 9.8	56.943	413	33.07	156	57.54	66	39.74	110	38.515	344	59.41	198	17.901	330	40.66	192
19.7	57.356	406	34.63	197	58.20	65	40.84	161	38.859	344	57.43	170	18.231	328	42.58	211
29.7	57.762	388	36.60	233	58.85	61	42.45	209	39.203	335	55.73	140	18.559	318	44.69	223
ly 9.7	58.150	361	38.93	262	59.46	57	44.54	252	39.538	318	54.33	104	18.877	298	46.92	231
19.7	58.511	328	41.55	284	60.03	52	47.06	288	39.856	292	53.29	68	19.175	274	49.23	233
29.6	58.839	286	44.39	303	60.55	45	49.94	319	40.148	259	52.61	31	19.449	241	51.56	228
ıg. 8.6	59.125	239	47.42	312	61.00	35	53.13	340	40.407	220	52.30	7	19.690	206	53.84	221
18.6	59.364	190	50.54	315	61.35	29	56.53	358	40.627	178	52.37	42	19.896	167	56.05	207
28.6	59.554	138	53.69	313	61.64	20	60.11	365	40.805	132	52.79	76	20.063	127	58.12	192
pt. 7.5	59.692	87	56.82	303	61.84	12	63.76	367	40.937	85	53.55	104	20.190	87	60.04	172
17.5	59.779	37	59.85	290	61.96	3	67.43	360	41.022	41	54.59	128	20.277	50	61.76	151
27.5	59.816	9	62.75	269	61.99	5	71.03	345	41.063	0	55.87	143	20.327	13	63.27	127
ct. 7.4	59.807	50	65.44	243	61.94	13	74.48	326	41.063	40	57.30	153	20.340	18	64.54	104
17.4	59.757	90	67.87	213	61.81	22	77.74	296	41.023	73	58.83	156	20.322	46	65.58	79
27.4	59.667	122	70.00	178	61.59	27	80.70	261	40.950	98	60.39	150	20.276	70	66.37	54
ov. 6.4	59.545	149	71.78	140	61.32	32	83.31	218	40.852	119	61.89	139	20.206	87	66.91	28
16.3	59.396	173	73.18	97	61.00	38	85.49	170	40.733	133	63.28	122	20.119	102	67.19	4
26.3	59.223	187	74.15	51	60.62	42	87.19	117	40.600	140	64.50	99	20.017	112	67.23	22
ec. 6.3	59.036	198	74.66	4	60.20	44	88.36	60	40.460	143	65.49	71	19.905	118	67.01	44
16.3	58.838	203	74.70	42	59.76	46	88.96	1	40.317	140	66.20	44	19.787	119	66.57	68
26.2	58.635	199	74.28	89	59.30	45	88.95	59	40.177	132	66.64	13	19.668	117	65.89	86
36.2	58.436		73.39		58.85		88.36		40.045		66.77		19.551		65.03	
n Place	54.967		33.59		55.971		43.89		36.240		82.88		15.780		33.40	
δ, Tan δ	1.439		+1.034		2.597		+2.396		1.139		−0.545		1.056		+0.338	
; $D_\psi a$	+0.06		−0.07		+0.06		−0.16		+0.06		+0.04		+0.06		−0.02	
$D_\psi \delta$	+0.4		−0.1		+0.4		−0.1		+0.4		−0.1		+0.4		−0.1	

FOR WASHINGTON APPARENT NOON.

Date.		Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Equation of Time. Mean—App.	Var. per Hour.	Semi-diameter.	S. T. of Sem. Pass. Merid.
		h m s	s	° ′ ″	″	m s	s	′ ″	m s
Jan.	1	18 46 47.50	11.041	−23 0 53.2	+12.34	+ 3 40.62	+1.182	16 17.87	1 11.05
	2	18 51 12.32	11.027	22 55 43.3	13.48	4 8.82	1.167	16 17.88	1 11.00
	3	18 55 36.77	11.010	22 50 6.1	14.61	4 36.63	1.150	16 17.88	1 10.95
	4	19 0 0.82	10.993	22 44 1.6	15.75	5 4.05	1.133	16 17.88	1 10.90
	5	19 4 24.45	10.975	22 37 30.1	16.87	5 31.04	1.115	16 17.87	1 10.84
	6	19 8 47.62	10.956	−22 30 31.9	+17.98	+ 5 57.58	+1.096	16 17.85	1 10.78
	7	19 13 10.33	10.936	22 23 7.0	19.09	6 23.66	1.076	16 17.82	1 10.72
	8	19 17 32.53	10.914	22 15 15.7	20.18	6 49.23	1.054	16 17.79	1 10.65
	9	19 21 54.20	10.892	22 6 58.1	21.27	7 14.29	1.032	16 17.76	1 10.57
	10	19 26 15.34	10.869	21 58 14.7	22.35	7 38.80	1.010	16 17.72	1 10.49
	11	19 30 35.92	10.845	−21 49 5.4	+23.42	+ 8 2.75	+0.986	16 17.67	1 10.41
	12	19 34 55.90	10.820	21 39 30.6	24.47	8 26.12	0.962	16 17.62	1 10.33
	13	19 39 15.29	10.794	21 29 30.7	25.52	8 48.89	0.935	16 17.56	1 10.25
	14	19 43 34.06	10.768	21 19 5.9	26.55	9 11.04	0.909	16 17.50	1 10.16
	15	19 47 52.19	10.741	21 8 16.3	27.57	9 32.55	0.882	16 17.42	1 10.07
	16	19 52 9.66	10.714	−20 57 2.4	+28.58	+ 9 53.40	+0.856	16 17.34	1 9.97
	17	19 56 26.45	10.685	20 45 24.4	29.58	10 13.58	0.827	16 17.26	1 9.88
	18	20 0 42.55	10.656	20 33 22.7	30.56	10 33.08	0.798	16 17.18	1 9.78
	19	20 4 57.95	10.626	20 20 57.6	31.53	10 51.85	0.768	16 17.09	1 9.68
	20	20 9 12.62	10.595	20 8 9.3	32.48	11 9.92	0.737	16 17.00	1 9.58
	21	20 13 26.55	10.564	−19 54 58.4	+33.42	+11 27.25	+0.706	16 16.90	1 9.47
	22	20 17 39.72	10.533	19 41 25.3	34.33	11 43.81	0.674	16 16.80	1 9.37
	23	20 21 52.11	10.500	19 27 30.1	35.24	11 59.60	0.642	16 16.70	1 9.26
	24	20 26 3.72	10.467	19 13 13.4	36.14	12 14.61	0.609	16 16.59	1 9.15
	25	20 30 14.52	10.433	18 58 35.6	37.00	12 28.82	0.575	16 16.48	1 9.04
	26	20 34 24.50	10.399	−18 43 36.9	+37.86	+12 42.21	+0.541	16 16.37	1 8.93
	27	20 38 33.67	10.365	18 28 18.0	38.70	12 54.79	0.507	16 16.25	1 8.81
	28	20 42 42.00	10.330	18 12 39.2	39.52	13 6.52	0.472	16 16.13	1 8.70
	29	20 46 49.50	10.295	17 56 40.8	40.33	13 17.43	0.438	16 16.00	1 8.59
	30	20 50 56.15	10.260	17 40 23.2	41.12	13 27.50	0.403	16 15.88	1 8.47
	31	20 55 1.96	10.225	−17 23 46.9	+41.89	+13 36.73	+0.368	16 15.74	1 8.36
Feb.	1	20 59 6.93	10.190	17 6 52.3	42.65	13 45.12	0.333	16 15.61	1 8.24
	2	21 3 11.07	10.155	16 49 39.7	43.39	13 52.68	0.298	16 15.46	1 8.13
	3	21 7 14.36	10.121	16 32 9.5	44.11	13 59.40	0.263	16 15.32	1 8.01
	4	21 11 16.83	10.086	16 14 22.2	44.82	14 5.29	0.229	16 15.16	1 7.90
	5	21 15 18.48	10.052	−15 56 18.2	+45.51	+14 10.37	+0.195	16 15.00	1 7.79
	6	21 19 19.30	10.018	15 37 57.8	46.18	14 14.63	0.161	16 14.83	1 7.67
	7	21 23 19.32	9.984	15 19 21.4	46.84	14 18.08	0.127	16 14.66	1 7.56
	8	21 27 18.54	9.951	15 0 29.4	47.48	14 20.74	0.094	16 14.49	1 7.45
	9	21 31 16.97	9.918	14 41 22.1	48.11	14 22.60	0.061	16 14.31	1 7.34
	10	21 35 14.61	9.886	−14 22 0.3	+48.72	+14 23.69	+0.029	16 14.12	1 7.23
	11	21 39 11.49	9.854	14 2 23.9	49.30	14 24.01	−0.003	16 13.94	1 7.12
	12	21 43 7.60	9.823	13 42 33.6	49.88	14 23.58	0.034	16 13.75	1 7.01
	13	21 47 2.98	9.792	13 22 29.6	50.44	14 22.40	0.064	16 13.55	1 6.90
	14	21 50 57.62	9.762	13 2 12.4	50.98	14 20.48	0.094	16 13.35	1 6.79
	15	21 54 51.54	9.732	−12 41 42.6	+51.50	+14 17.85	−0.124	16 13.14	1 6.68
	16	*21 58 44.74*	9.703	−12 21 0.4	+52.01	+14 14.51	−0.153	16 12.93	1 6.5[illegible]

NOTE.—For mean time interval of semidiameter passing meridian, subtract $0^s.19$ *from the side*

WASHINGTON APPARENT NOON.

Var. per Hour.	Apparent Declination.	Var. per Hour.	Equation of Time. Mean—App.	Var. per Hour.	Semi-diameter.	S. T. of Sem. Pass. Merid.	Sidereal Time of Mean Noon.
s	° ′ ″	″	m s	s	′ ″	m s	h m s
9.703	−12 21 0.4	+52.01	+14 14.51	−0.153	16 12.93	1 6.58	21 44 27.89
9.674	12 0 6.1	52.50	14 10.48	0.182	16 12.72	1 6.48	21 48 24.45
9.645	11 39 0.4	52.97	14 5.76	0.211	16 12.51	1 6.38	21 52 21.00
9.617	11 17 43.7	53.41	14 0.37	0.239	16 12.29	1 6.28	21 56 17.55
9.589	10 56 16.3	53.85	13 54.31	0.266	16 12.07	1 6.18	22 0 14.11
9.562	−10 34 38.6	+54.27	+13 47.59	−0.293	16 11.85	1 6.09	22 4 10.66
9.536	10 12 51.2	54.67	13 40.24	0.320	16 11.63	1 5.99	22 8 7.21
9.509	9 50 54.5	55.05	13 32.25	0.346	16 11.41	1 5.90	22 12 3.77
9.484	9 28 48.9	55.40	13 23.63	0.371	16 11.19	1 5.81	22 16 0.32
9.459	9 6 34.9	55.75	13 14.41	0.396	16 10.96	1 5.73	22 19 56.88
9.434	− 8 44 13.0	+56.08	+13 4.60	−0.421	16 10.73	1 5.64	22 23 53.43
9.410	8 21 43.4	56.38	12 54.20	0.445	16 10.50	1 5.56	22 27 49.98
9.387	7 59 6.6	56.67	12 43.24	0.468	16 10.27	1 5.49	22 31 46.54
9.365	7 36 23.0	56.95	12 31.73	0.490	16 10.04	1 5.41	22 35 43.09
9.344	7 13 32.9	57.21	12 19.70	0.511	16 9.80	1 5.34	22 39 39.65
9.323	− 6 50 36.7	+57.46	+12 7.17	−0.532	16 9.56	1 5.27	22 43 36.20
9.303	6 27 35.0	57.68	11 54.14	0.552	16 9.32	1 5.21	22 47 32.75
9.283	6 4 28.0	57.89	11 40.66	0.571	16 9.08	1 5.14	22 51 29.31
9.265	5 41 16.0	58.09	11 26.72	0.590	16 8.83	1 5.08	22 55 25.86
9.248	5 17 59.4	58.28	11 12.36	0.606	16 8.58	1 5.02	22 59 22.41
9.232	− 4 54 38.6	+58.44	+10 57.61	−0.622	16 8.32	1 4.96	23 3 18.97
9.217	4 31 14.0	58.59	10 42.48	0.638	16 8.06	1 4.91	23 7 15.52
9.202	4 7 46.0	58.74	10 27.00	0.652	16 7.80	1 4.85	23 11 12.07
9.189	3 44 14.8	58.85	10 11.18	0.666	16 7.53	1 4.81	23 15 8.63
9.177	3 20 40.8	58.96	9 55.06	0.678	16 7.27	1 4.76	23 19 5.18
9.166	− 2 57 4.5	+59.06	+ 9 38.64	−0.689	16 7.00	1 4.72	23 23 1.73
9.155	2 33 26.1	59.13	9 21.97	0.700	16 6.73	1 4.68	23 26 58.28
9.145	2 9 45.9	59.20	9 5.05	0.709	16 6.46	1 4.64	23 30 54.84
9.136	1 46 4.5	59.25	8 47.91	0.718	16 6.18	1 4.60	23 34 51.39
9.129	1 22 22.2	59.27	8 30.59	0.725	16 5.91	1 4.57	23 38 47.94
9.122	− 0 58 39.2	+59.29	+ 8 13.09	−0.732	16 5.63	1 4.55	23 42 44.50
9.116	0 34 56.0	59.30	7 55.43	0.738	16 5.36	1 4.53	23 46 41.05
9.110	− 0 11 13.0	59.27	7 37.63	0.744	16 5.08	1 4.51	23 50 37.60
9.105	+ 0 12 29.3	59.24	7 19.72	0.749	16 4.80	1 4.49	23 54 34.16
9.101	0 36 10.7	59.20	7 1.68	0.753	16 4.53	1 4.47	23 58 30.71
9.098	+ 0 59 50.7	+59.13	+ 6 43.56	−0.756	16 4.25	1 4.46	0 2 27.26
9.096	1 23 29.0	59.05	6 25.38	0.759	16 3.98	1 4.45	0 6 23.81
9.094	1 47 5.1	58.95	6 7.14	0.761	16 3.71	1 4.44	0 10 20.37
9.092	2 10 38.8	58.84	5 48.84	0.762	16 3.43	1 4.44	0 14 16.92
9.091	2 34 9.5	58.71	5 30.53	0.763	16 3.16	1 4.44	0 18 13.47
9.091	+ 2 57 37.0	+58.57	+ 5 12.22	−0.763	16 2.89	1 4.44	0 22 10.03
9.092	3 21 0.9	58.41	4 53.91	0.762	16 2.62	1 4.44	0 26 6.58
9.094	3 44 20.7	58.24	4 35.63	0.760	16 2.35	1 4.45	0 30 3.13
9.097	4 7 36.4	58.06	4 17.41	0.757	16 2.08	1 4.46	0 33 59.69
9.100	4 30 47.4	57.86	3 59.26	0.754	16 1.81	1 4.48	0 37 56.24
9.104	+ 4 53 53.4	+57.64	+ 3 41.20	−0.750	16 1.54	1 4.49	0 41 52.79
9.109	+ 5 16 54.1	+57.41	+ 3 23.25	−0.745	16 1.26	1 4.52	0 45 49.34

Interval of semidiameter passing meridian, subtract 0s.18 from the sidereal interval.

FOR WASHINGTON APPARENT NOON.

Date.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Equation of Time. Mean—App.	Var. per Hour.	Semi-diameter.	S. T. of Sem. Pass. Merid.
	h m s	s	° ′ ″	″	m s	s	′ ″	m s
Apr. 1	0 41 56.15	9.100	+ 4 30 47.4	+57.86	+3 59.26	−0.754	16 1.81	1 4.46
2	0 45 34.60	9.104	4 53 53.4	57.64	3 41.20	0.750	16 1.54	1 4.49
3	0 49 13.16	9.109	5 16 54.1	57.41	3 23.25	0.745	16 1.26	1 4.52
4	0 52 51.85	9.115	5 39 49.3	57.17	3 5.44	0.739	16 0.99	1 4.54
5	0 56 30.68	9.122	6 2 38.4	56.91	2 47.77	0.732	16 0.72	1 4.57
6	1 0 9.70	9.130	+ 6 25 21.3	+56.65	+2 30.29	−0.724	16 0.44	1 4.60
7	1 3 48.91	9.139	6 47 57.6	56.37	2 12.99	0.716	16 0.17	1 4.63
8	1 7 28.35	9.148	7 10 27.0	56.07	1 55.92	0.707	15 59.90	1 4.66
9	1 11 8.03	9.158	7 32 49.2	55.76	1 39.09	0.696	15 59.62	1 4.70
10	1 14 47.95	9.170	7 55 3.7	55.44	1 22.51	0.684	15 59.34	1 4.74
11	1 18 28.16	9.182	+ 8 17 10.5	+55.11	+1 6.22	−0.672	15 59.07	1 4.78
12	1 22 8.69	9.195	8 39 9.0	54.76	0 50.22	0.659	15 58.79	1 4.82
13	1 25 49.52	9.208	9 0 59.1	54.40	0 34.55	0.646	15 58.51	1 4.87
14	1 29 30.70	9.223	9 22 40.2	54.02	0 19.22	0.632	15 58.24	1 4.91
15	1 33 12.24	9.238	9 44 12.2	53.65	+0 4.23	0.617	15 57.96	1 4.96
16	1 36 54.14	9.254	+10 5 34.6	+53.28	−0 10.37	−0.601	15 57.69	1 5.01
17	1 40 36.43	9.271	10 26 47.1	52.81	0 24.60	0.584	15 57.42	1 5.07
18	1 44 19.13	9.288	10 47 49.4	52.37	0 38.42	0.567	15 57.15	1 5.13
19	1 48 2.23	9.305	11 8 41.0	51.92	0 51.84	0.550	15 56.89	1 5.18
20	1 51 45.74	9.322	11 29 21.6	51.46	1 4.83	0.532	15 56.63	1 5.24
21	1 55 29.69	9.340	+11 49 51.0	+50.98	−1 17.41	−0.515	15 56.37	1 5.31
22	1 59 14.07	9.359	12 10 8.7	50.48	1 29.54	0.496	15 56.11	1 5.37
23	2 2 58.91	9.378	12 30 14.3	49.98	1 41.24	0.478	15 55.86	1 5.44
24	2 6 44.20	9.397	12 50 7.6	49.45	1 52.47	0.459	15 55.61	1 5.51
25	2 10 29.95	9.416	13 9 48.1	48.91	2 3.25	0.440	15 55.36	1 5.58
26	2 14 16.16	9.435	+13 29 15.6	+48.37	−2 13.56	−0.420	15 55.12	1 5.65
27	2 18 2.86	9.455	13 48 29.7	47.80	2 23.39	0.400	15 54.88	1 5.72
28	2 21 50.04	9.476	14 7 30.2	47.22	2 32.73	0.379	15 54.64	1 5.80
29	2 25 37.73	9.497	14 26 16.5	46.63	2 41.58	0.359	15 54.40	1 5.88
30	2 29 25.92	9.518	14 44 48.6	46.03	2 49.93	0.337	15 54.16	1 5.95
May 1	2 33 14.62	9.540	+15 3 6.1	+45.42	−2 57.75	−0.315	15 53.93	1 6.03
2	2 37 3.84	9.562	15 21 8.6	44.79	3 5.06	0.293	15 53.70	1 6.11
3	2 40 53.60	9.585	15 38 56.0	44.15	3 11.84	0.271	15 53.46	1 6.19
4	2 44 43.89	9.607	15 56 27.8	43.50	3 18.09	0.249	15 53.24	1 6.27
5	2 48 34.73	9.630	16 13 43.7	42.83	3 23.79	0.226	15 53.01	1 6.35
6	2 52 26.13	9.653	+16 30 43.0	+42.15	−3 28.93	−0.203	15 52.78	1 6.43
7	2 56 18.10	9.677	16 47 27.0	41.46	3 33.51	0.179	15 52.56	1 6.51
8	3 0 10.63	9.701	17 3 53.8	40.76	3 37.53	0.155	15 52.34	1 6.59
9	3 4 3.73	9.725	17 20 3.5	40.05	3 40.96	0.131	15 52.11	1 6.68
10	3 7 57.43	9.749	17 35 56.0	39.32	3 43.82	0.107	15 51.90	1 6.76
11	3 11 51.72	9.774	+17 51 30.9	+38.58	−3 46.08	−0.082	15 51.68	1 6.84
12	3 15 46.59	9.799	18 6 48.0	37.83	3 47.75	0.057	15 51.47	1 6.92
13	3 19 42.07	9.824	18 21 46.9	37.07	3 48.83	0.033	15 51.26	1 7.00
14	3 23 38.14	9.848	18 36 27.3	36.29	3 49.31	−0.008	15 51.05	1 7.08
15	3 27 34.80	9.873	18 50 49.1	35.51	3 49.20	+0.017	15 50.84	1 7.16
16	3 31 32.07	9.898	+19 4 51.7	+34.71	−3 48.50	+0.041	15 50.64	1 7.24
17	3 35 29.92	9.922	+19 18 35.1	+33.89	−3 47.22	+0.065	15 50.44	1 7.32

Note.—For mean time interval of semidiameter passing meridian, subtract 0s.18 from the sider

WASHINGTON APPARENT NOON.

Var. per Hour.	Apparent Declination.	Var. per Hour.	Equation of Time. Mean—App.	Var. per Hour.	Semi-diameter.	S. T. of Sem. Pass. Merid.	Sidereal Time of Mean Noon.
s	° ′ ″	″	m s	s	′ ″	m s	h m s
9.922	+19 18 35.1	+33.89	−3 47.22	+0.065	15 50.44	1 7.32	3 39 17.75
9.946	19 31 58.8	33.07	3 45.35	0.089	15 50.24	1 7.40	3 43 14.31
9.970	19 45 2.7	32.24	3 42.92	0.113	15 50.05	1 7.48	3 47 10.86
9.992	19 57 46.4	31.40	3 39.95	0.136	15 49.86	1 7.56	3 51 7.42
10.015	20 10 9.7	30.54	3 36.41	0.159	15 49.68	1 7.63	3 55 3.98
10.037	+20 22 12.3	+29.67	−3 32.35	+0.180	15 49.51	1 7.71	3 59 0.54
10.058	20 33 53.8	28.79	3 27.76	0.201	15 49.34	1 7.78	4 2 57.09
10.079	20 45 14.2	27.91	3 22.66	0.222	15 49.17	1 7.85	4 6 53.65
10.100	20 56 13.2	27.01	3 17.06	0.243	15 49.01	1 7.92	4 10 50.21
10.120	21 6 50.6	26.10	3 10.99	0.263	15 48.85	1 7.99	4 14 46.76
10.139	+21 17 6.1	+25.18	−3 4.44	+0.282	15 48.70	1 8.06	4 18 43.32
10.159	21 26 59.6	24.26	2 57.43	0.301	15 48.55	1 8.13	4 22 39.88
10.177	21 36 30.7	23.33	2 49.99	0.319	15 48.40	1 8.19	4 26 36.43
10.195	21 45 39.3	22.39	2 42.11	0.337	15 48.26	1 8.25	4 30 32.99
10.211	21 54 25.4	21.44	2 33.81	0.354	15 48.12	1 8.31	4 34 29.55
10.227	+22 2 48.6	+20.48	−2 25.12	+0.370	15 47.98	1 8.37	4 38 26.11
10.243	22 10 48.8	19.52	2 16.04	0.386	15 47.85	1 8.43	4 42 22.66
10.259	22 18 25.8	18.55	2 6.58	0.401	15 47.72	1 8.48	4 46 19.22
10.274	22 25 39.4	17.58	1 56.77	0.416	15 47.59	1 8.53	4 50 15.78
10.288	22 32 29.5	16.60	1 46.62	0.430	15 47.47	1 8.58	4 54 12.34
10.302	+22 38 56.0	+15.61	−1 36.12	+0.444	15 47.35	1 8.63	4 58 8.89
10.315	22 44 58.8	14.62	1 25.31	0.457	15 47.23	1 8.67	5 2 5.45
10.327	22 50 37.7	13.62	1 14.19	0.470	15 47.12	1 8.71	5 6 2.01
10.338	22 55 52.6	12.61	1 2.78	0.481	15 47.01	1 8.75	5 9 58.57
10.349	23 0 43.2	11.60	0 51.11	0.492	15 46.90	1 8.78	5 13 55.13
10.360	+23 5 9.6	+10.59	−0 39.17	+0.502	15 46.79	1 8.81	5 17 51.68
10.369	23 9 11.5	9.57	0 27.02	0.511	15 46.68	1 8.83	5 21 48.24
10.377	23 12 49.1	8.55	0 14.64	0.519	15 46.59	1 8.86	5 25 44.80
10.384	23 16 2.1	7.53	−0 2.09	0.526	15 46.49	1 8.88	5 29 41.36
10.391	23 18 50.4	6.50	+0 10.62	0.532	15 46.40	1 8.90	5 33 37.92
10.396	+23 21 14.0	+ 5.47	+0 23.48	+0.538	15 46.32	1 8.91	5 37 34.47
10.400	23 23 12.9	4.44	0 36.45	0.542	15 46.25	1 8.92	5 41 31.03
10.402	23 24 46.9	3.40	0 49.50	0.544	15 46.18	1 8.93	5 45 27.59
10.404	23 25 56.2	2.37	1 2.59	0.546	15 46.11	1 8.94	5 49 24.15
10.405	23 26 40.6	1.33	1 15.71	0.547	15 46.05	1 8.94	5 53 20.71
10.404	+23 27 0.2	+ 0.30	+1 28.84	+0.546	15 4 .99	1 8.94	5 57 17.26
10.402	23 26 55.0	− 0.73	1 41.93	0.544	15 45.94	1 8.94	6 1 13.82
10.399	23 26 25.0	1.77	1 54.97	0.541	15 45.90	1 8.93	6 5 10.38
10.395	23 25 30.2	2.80	2 7.91	0.537	15 45.86	1 8.92	6 9 6.94
10.390	23 24 10.7	3.83	2 20.74	0.532	15 45.82	1 8.91	6 13 3.50
10.385	+23 22 26.4	− 4.86	+2 33.46	+0.527	15 45.79	1 8.89	6 17 0.05
10.377	23 20 17.6	5.88	2 46.01	0.519	15 45.77	1 8.87	6 20 56.61
10.369	23 17 44.1	6.90	2 58.38	0.511	15 45.75	1 8.85	6 24 53.17
10.360	23 14 46.3	7.92	3 10.56	0.502	15 45.73	1 8.81	6 28 49.73
10.350	23 11 23.9	8.94	3 22.50	0.493	15 45.72	1 8.78	6 32 46.28
10.340	+23 7 37.2	− 9.96	+3 34.19	+0.482	15 45.71	1 8.75	6 36 42.84
10.328	*+23 3 26.5*	−10.96	+3 45.63	+0.470	15 45.71	1 8.71	6 40 39.40

e interval of semidiameter passing meridian, subtract 0s.19 from the sidereal interval.

FOR WASHINGTON APPARENT NOON.

Date.		Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Equation of Time. Mean—App.	Var. per Hour.	Semi-diameter.	S. T. of Sem. Pass. Merid.
		h m s	s	° ′ ″	″	m s	s	′ ″	m s
July	1	6 40 17.62	10.340	+23 7 37.2	− 9.95	+3 34.19	+0.482	15 45.71	1 8.75
	2	6 44 25.64	10.328	23 3 26.5	10.95	3 45.63	0.470	15 45.71	1 8.71
	3	6 48 33.38	10.316	22 58 51.5	11.95	3 56.76	0.458	15 45.70	1 8.67
	4	6 52 40.80	10.303	22 53 52.5	12.95	4 7.61	0.445	15 45.70	1 8.63
	5	6 56 47.93	10.290	22 48 29.6	13.95	4 18.15	0.432	15 45.71	1 8.59
	6	7 0 54.71	10.276	+22 42 42.9	−14.93	+4 28.34	+0.418	15 45.71	1 8.54
	7	7 5 1.15	10.261	22 36 32.7	15.92	4 38.20	0.403	15 45.72	1 8.49
	8	7 9 7.24	10.246	22 29 58.7	16.90	4 47.70	0.389	15 45.74	1 8.44
	9	7 13 12.96	10.230	22 23 1.5	17.87	4 56.84	0.372	15 45.75	1 8.38
	10	7 17 18.28	10.213	22 15 41.0	18.84	5 5.58	0.355	15 45.78	1 8.32
	11	7 21 23.21	10.196	+22 7 57.3	−19.79	+5 13.92	+0.338	15 45.81	1 8.26
	12	7 25 27.70	10.178	21 59 50.9	20.74	5 21.85	0.321	15 45.84	1 8.20
	13	7 29 31.76	10.160	21 51 21.6	21.69	5 29.32	0.302	15 45.87	1 8.14
	14	7 33 35.37	10.141	21 42 29.9	22.62	5 36.35	0.283	15 45.91	1 8.07
	15	7 37 38.51	10.121	21 33 15.9	23.55	5 42.93	0.264	15 45.95	1 8.00
	16	7 41 41.16	10.100	+21 23 39.8	−24.46	+5 49.00	+0.243	15 46.00	1 7.92
	17	7 45 43.30	10.078	21 13 41.8	25.36	5 54.57	0.221	15 46.05	1 7.85
	18	7 49 44.92	10.056	21 3 22.1	26.26	5 59.62	0.199	15 46.12	1 7.77
	19	7 53 46.01	10.034	20 52 41.2	27.15	6 4.14	0.177	15 46.18	1 7.70
	20	7 57 46.53	10.011	20 41 39.1	28.02	6 8.10	0.154	15 46.26	1 7.62
	21	8 1 46.51	9.987	+20 30 16.1	−28.88	+6 11.51	+0.130	15 46.34	1 7.54
	22	8 5 45.92	9.963	20 18 32.5	29.74	6 14.35	0.106	15 46.42	1 7.46
	23	8 9 44.73	9.939	20 6 28.4	30.59	6 16.60	0.082	15 46.51	1 7.38
	24	8 13 42.96	9.914	19 54 4.3	31.42	6 18.26	0.057	15 46.60	1 7.29
	25	8 17 40.59	9.888	19 41 20.4	32.23	6 19.32	0.032	15 46.70	1 7.21
	26	8 21 37.60	9.862	+19 28 16.9	−33.04	+6 19.79	+0.006	15 46.80	1 7.13
	27	8 25 34.00	9.837	19 14 54.2	33.84	6 19.63	−0.020	15 46.90	1 7.04
	28	8 29 29.78	9.811	19 1 12.4	34.63	6 18.86	0.045	15 47.02	1 6.96
	29	8 33 24.95	9.785	18 47 11.9	35.40	6 17.47	0.071	15 47.13	1 6.87
	30	8 37 19.48	9.759	18 32 53.0	36.16	6 15.46	0.097	15 47.25	1 6.79
	31	8 41 13.40	9.733	+18 18 15.9	−36.92	+6 12.82	−0.123	15 47.37	1 6.70
Aug.	1	8 45 6.70	9.708	18 3 20.8	37.66	6 9.57	0.148	15 47.50	1 6.61
	2	8 48 59.38	9.683	17 48 8.1	38.39	6 5.71	0.173	15 47.62	1 6.53
	3	8 52 51.46	9.658	17 32 38.0	39.11	6 1.24	0.198	15 47.75	1 6.44
	4	8 56 42.93	9.633	17 16 50.8	39.82	5 56.17	0.223	15 47.88	1 6.35
	5	9 0 33.80	9.608	+17 0 46.9	−40.51	+5 50.51	−0.248	15 48.02	1 6.27
	6	9 4 24.10	9.584	16 44 26.2	41.20	5 44.26	0.272	15 48.15	1 6.18
	7	9 8 13.80	9.559	16 27 49.2	41.87	5 37.44	0.296	15 48.29	1 6.09
	8	9 12 2.94	9.536	16 10 56.2	42.54	5 30.04	0.320	15 48.44	1 6.01
	9	9 15 51.51	9.512	15 53 47.5	43.18	5 22.08	0.343	15 48.58	1 5.92
	10	9 19 39.53	9.489	+15 36 23.4	−43.81	+5 13.56	−0.367	15 48.73	1 5.84
	11	9 23 26.98	9.466	15 18 44.2	44.44	5 4.48	0.390	15 48.88	1 5.76
	12	9 27 13.89	9.443	15 0 50.2	45.05	4 54.85	0.413	15 49.04	1 5.67
	13	9 31 0.24	9.420	14 42 41.6	45.65	4 44.69	0.435	15 49.21	1 5.59
	14	9 34 46.06	9.398	14 24 19.0	46.23	4 33.98	0.457	15 49.38	1 5.51
	15	*9 38 31.35*	9.376	+14 5 42.6	−46.80	+4 22.74	−0.479	15 49.55	1 5.44
	16	*9 42 16.10*	9.354	+13 46 52.6	−47.36	+4 10.98	−0.501	15 49.72	1 5.36

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0s.18 from the side

FOR WASHINGTON APPARENT NOON.

Day.	Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Equation of Time. Mean—App.	Var. per Hour.	Semi-diameter.	S. T. of Sem. Pass. Merid.	Sidereal Time of Mean Noon.
	h m s	s	° ′ ″	″	m s	s	′ ″	m s	h m s
16	9 42 16.10	9.354	+13 46 52.6	−47.36	+ 4 10.98	−0.501	15 49.72	1 5.36	9 38 4.44
17	9 46 0.34	9.333	13 27 49.5	47.89	3 58.69	0.522	15 49.90	1 5.29	9 42 1.00
18	9 49 44.07	9.312	13 8 33.7	48.42	3 45.90	0.543	15 50.09	1 5.21	9 45 57.55
19	9 53 27.29	9.291	12 49 5.4	48.94	3 32.60	0.564	15 50.28	1 5.14	9 49 54.11
20	9 57 10.02	9.271	12 29 24.8	49.43	3 18.82	0.584	15 50.47	1 5.07	9 53 50.66
21	10 0 52.26	9.250	+12 9 32.5	−49.91	+ 3 4.55	−0.604	15 50.67	1 5.00	9 57 47.22
22	10 4 34.03	9.231	11 49 28.8	50.39	2 49.79	0.624	15 50.87	1 4.94	10 1 43.77
23	10 8 15.32	9.211	11 29 13.8	50.85	2 34.58	0.643	15 51.08	1 4.87	10 5 40.32
24	10 11 56.17	9.193	11 8 48.1	51.29	2 18.91	0.662	15 51.29	1 4.81	10 9 36.88
25	10 15 36.58	9.175	10 48 11.9	51.72	2 2.81	0.680	15 51.50	1 4.74	10 13 33.43
26	10 19 16.56	9.157	+10 27 25.6	−52.14	+ 1 46.27	−0.698	15 51.72	1 4.68	10 17 29.99
27	10 22 56.12	9.140	10 6 29.4	52.54	1 29.34	0.714	15 51.94	1 4.63	10 21 26.54
28	10 26 35.28	9.124	9 45 23.7	52.93	1 11.99	0.730	15 52.16	1 4.57	10 25 23.09
29	10 30 14.06	9.109	9 24 8.7	53.31	0 54.27	0.746	15 52.39	1 4.52	10 29 19.65
30	10 33 52.49	9.094	9 2 44.9	53.67	0 36.19	0.760	15 52.61	1 4.47	10 33 16.20
31	10 37 30.57	9.080	+ 8 41 12.4	−54.02	+ 0 17.77	−0.774	15 52.84	1 4.42	10 37 12.76
1	10 41 8.33	9.067	8 19 31.6	54.37	− 0 0.98	0.788	15 53.06	1 4.37	10 41 9.31
2	10 44 45.79	9.055	7 57 42.8	54.70	0 20.02	0.799	15 53.29	1 4.33	10 45 5.86
3	10 48 22.97	9.044	7 35 46.1	55.02	0 39.34	0.810	15 53.52	1 4.29	10 49 2.42
4	10 51 59.90	9.034	7 13 41.9	55.32	0 58.91	0.820	15 53.75	1 4.25	10 52 58.97
5	10 55 36.59	9.024	+ 6 51 30.6	−55.61	− 1 18.72	−0.830	15 53.99	1 4.22	10 56 55.52
6	10 59 13.07	9.016	6 29 12.5	55.89	1 38.73	0.838	15 54.22	1 4.18	11 0 52.08
7	11 2 49.37	9.009	6 6 47.8	56.16	1 58.94	0.845	15 54.46	1 4.15	11 4 48.63
8	11 6 25.47	9.002	5 44 16.9	56.41	2 19.33	0.852	15 54.69	1 4.13	11 8 45.18
9	11 10 1.42	8.995	5 21 40.2	56.65	2 39.88	0.859	15 54.93	1 4.10	11 12 41.73
10	11 13 37.23	8.990	+ 4 58 58.0	−56.87	− 3 0.56	−0.864	15 55.18	1 4.08	11 16 38.29
11	11 17 12.94	8.985	4 36 10.4	57.08	3 21.35	0.869	15 55.42	1 4.06	11 20 34.84
12	11 20 48.53	8.981	4 13 18.0	57.28	3 42.26	0.873	15 55.67	1 4.05	11 24 31.39
13	11 24 24.02	8.978	3 50 21.2	57.46	4 3.26	0.876	15 55.92	1 4.03	11 28 27.95
14	11 27 59.46	8.976	3 27 20.2	57.62	4 24.32	0.878	15 56.18	1 4.02	11 32 24.50
15	11 31 34.84	8.974	+ 3 4 15.5	−57.77	− 4 45.44	−0.880	15 56.43	1 4.01	11 36 21.05
16	11 35 10.17	8.972	2 41 7.2	57.91	5 6.60	0.882	15 56.69	1 4.01	11 40 17.61
17	11 38 45.50	8.972	2 17 55.9	58.02	5 27.77	0.882	15 56.96	1 4.01	11 44 14.16
18	11 42 20.82	8.972	1 54 41.8	58.13	5 48.94	0.882	15 57.22	1 4.01	11 48 10.71
19	11 45 56.15	8.973	1 31 25.3	58.23	6 10.11	0.881	15 57.49	1 4.01	11 52 7.26
20	11 49 31.52	8.974	+ 1 8 6.8	−58.30	− 6 31.23	−0.880	15 57.76	1 4.02	11 56 3.82
21	11 53 6.93	8.977	0 44 46.6	58.37	6 52.31	0.877	15 58.03	1 4.03	12 0 0.37
22	11 56 42.42	8.981	+ 0 21 25.1	58.42	7 13.32	0.873	15 58.30	1 4.04	12 3 56.92
23	12 0 18.00	8.985	− 0 1 57.3	58.45	7 34.24	0.869	15 58.58	1 4.06	12 7 53.48
24	12 3 53.67	8.989	0 25 20.5	58.47	7 55.06	0.865	15 58.86	1 4.08	12 11 50.03
25	12 7 29.48	8.995	− 0 48 44.0	−58.48	− 8 15.75	−0.859	15 59.13	1 4.11	12 15 46.58
26	12 11 5.42	9.001	1 12 7.4	58.47	8 36.29	0.853	15 59.41	1 4.14	12 19 43.14
27	12 14 41.54	9.009	1 35 30.4	58.44	8 56.68	0.845	15 59.69	1 4.17	12 23 39.69
28	12 18 17.86	9.018	1 58 52.7	58.41	9 16.87	0.837	15 59.97	1 4.20	12 27 36.24
29	12 21 54.38	9.027	2 22 14.0	58.36	9 36.84	0.827	16 0.24	1 4.23	12 31 32.79
30	12 25 31.14	9.037	− 2 45 34.0	−58.30	− 9 56.57	−0.817	16 0.52	1 4.27	12 35 29.35
t. 1	*12 29 8.16*	*9.049*	*− 3 8 52.5*	−58.22	−10 16.05	−0.805	16 0.80	1 4.31	12 39 25.90

Note.—For mean time interval of semidiameter passing meridian, subtract 0s.18 from the sidereal interval.

FOR WASHINGTON APPARENT NOON.

Date.		Apparent Right Ascension.	Var. per Hour.	Apparent Declination.	Var. per Hour.	Equation of Time. Mean—App.	Var. per Hour.	Semi-diameter.	S. T. of Sem. Pa Merid.
		h m s	s	° ′ ″	″	m s	s	′ ″	m s
Oct.	1	12 29 8.16	9.049	− 3 8 52.5	−58.22	−10 16.05	−0.805	16 0.80	1 4.3
	2	12 32 45.49	9.062	3 32 9.0	58.14	10 35.22	0.792	16 1.07	1 4.3
	3	12 36 23.12	9.075	3 55 23.1	58.03	10 54.09	0.779	16 1.35	1 4.4
	4	12 40 1.10	9.089	4 18 34.6	57.91	11 12.62	0.765	16 1.62	1 4.4
	5	12 43 39.43	9.105	4 41 43.2	57.78	11 30.79	0.749	16 1.89	1 4.5
	6	12 47 18.16	9.122	− 5 4 48.3	−57.64	−11 48.56	−0.732	16 2.16	1 4.5
	7	12 50 57.28	9.139	5 27 49.9	57.48	12 5.95	0.715	16 2.43	1 4.6
	8	12 54 36.84	9.157	5 50 47.4	57.30	12 22.90	0.697	16 2.70	1 4.6
	9	12 58 16.83	9.176	6 13 40.4	57.11	12 39.41	0.678	16 2.98	1 4.7
	10	13 1 57.30	9.196	6 36 28.5	56.89	12 55.46	0.659	16 3.25	1 4.8
	11	13 5 38.24	9.216	− 6 59 11.5	−56.67	−13 11.02	−0.639	16 3.52	1 4.8
	12	13 9 19.68	9.238	7 21 49.0	56.43	13 26.10	0.617	16 3.79	1 4.9
	13	13 13 1.63	9.260	7 44 20.3	56.17	13 40.65	0.595	16 4.06	1 5.0
	14	13 16 44.12	9.282	8 6 45.2	55.90	13 54.69	0.573	16 4.34	1 5.1
	15	13 20 27.16	9.305	8 29 3.5	55.61	14 8.17	0.550	16 4.61	1 5.1
	16	13 24 10.75	9.328	− 8 51 14.5	−55.30	−14 21.08	−0.526	16 4.88	1 5.2
	17	13 27 54.92	9.352	9 13 17.9	54.98	14 33.43	0.502	16 5.16	1 5.3
	18	13 31 39.69	9.378	9 35 13.4	54.64	14 45.20	0.478	16 5.43	1 5.4
	19	13 35 25.05	9.404	9 57 0.5	54.28	14 56.36	0.452	16 5.71	1 5.5
	20	13 39 11.03	9.430	10 18 38.7	53.90	15 6.90	0.426	16 5.98	1 5.6
	21	13 42 57.65	9.456	−10 40 7.8	−53.51	−15 16.81	−0.399	16 6.26	1 5.7
	22	13 46 44.91	9.483	11 1 27.3	53.10	15 26.08	0.373	16 6.53	1 5.8
	23	13 50 32.80	9.510	11 22 36.7	52.68	15 34.70	0.345	16 6.81	1 5.9
	24	13 54 21.39	9.538	11 43 35.8	52.23	15 42.65	0.317	16 7.08	1 6.0
	25	13 58 10.66	9.567	12 4 24.1	51.78	15 49.92	0.289	16 7.35	1 6.1
	26	14 2 0.62	9.596	−12 25 1.3	−51.31	−15 56.50	−0.259	16 7.62	1 6.2
	27	14 5 51.30	9.627	12 45 27.0	50.82	16 2.35	0.229	16 7.88	1 6.3
	28	14 9 42.72	9.658	13 5 40.7	50.31	16 7.48	0.198	16 8.15	1 6.4
	29	14 13 34.88	9.690	13 25 42.1	49.80	16 11.85	0.166	16 8.40	1 6.5
	30	14 17 27.81	9.722	13 45 30.9	49.26	16 15.47	0.134	16 8.66	1 6.6
	31	14 21 21.52	9.755	−14 5 6.7	−48.71	−16 18.31	−0.102	16 8.91	1 6.7
Nov.	1	14 25 16.03	9.788	14 24 28.9	48.14	16 20.34	0.068	16 9.16	1 6.8
	2	14 29 11.35	9.822	14 43 37.4	47.55	16 21.59	0.035	16 9.40	1 7.0
	3	14 33 7.48	9.856	15 2 31.5	46.95	16 22.01	−0.001	16 9.64	1 7.
	4	14 37 4.45	9.891	15 21 11.1	46.34	16 21.59	+0.034	16 9.88	1 7.
	5	14 41 2.26	9.926	−15 39 35.7	−45.70	−16 20.34	+0.070	16 10.12	1 7.
	6	14 45 0.92	9.962	15 57 44.7	45.04	16 18.24	0.105	16 10.35	1 7.
	7	14 49 0.44	9.998	16 15 37.9	44.37	16 15.29	0.141	16 10.59	1 7.
	8	14 53 0.81	10.034	16 33 14.8	43.69	16 11.47	0.177	16 10.82	1 7.
	9	14 57 2.06	10.070	16 50 34.9	42.99	16 6.81	0.213	16 11.04	1 7.
	10	15 1 4.16	10.106	−17 7 37.9	−42.26	−16 1.27	+0.249	16 11.27	1 7.
	11	15 5 7.13	10.142	17 24 23.4	41.52	15 54.88	0.285	16 11.49	1 8.
	12	15 9 10.95	10.178	17 40 51.0	40.77	15 47.62	0.320	16 11.71	1 8.
	13	15 13 15.65	10.213	17 57 0.1	39.99	15 39.51	0.356	16 11.93	1 8.
	14	15 17 21.20	10.249	18 12 50.4	39.20	15 30.54	0.391	16 12.14	1 8.
	15	15 21 27.60	10.284	−18 28 21.6	−38.39	−15 20.72	+0.426	16 12.36	1 8.
	16	*15 25 34.85*	10.319	−18 43 33.3	−37.57	−15 10.06	+0.461	16 12.57	1 8.

Note.—For mean time interval of semidiameter passing meridian, subtract 0s.18 from the sid

WASHINGTON APPARENT NOON.

	Var. per Hour.	Apparent Declination.	Var. per Hour.	Equation of Time. Mean—App.	Var. per Hour.	Semi-diameter.	S. T. of Sem. Pass. Merid.	Sidereal Time of Mean Noon.
	s	° ′ ″	″	m s	s	′ ″	m s	h m s
5	10.319	−18 43 33.3	−37.57	−15 10.06	+0.461	16 12.57	1 8.66	15 40 47.40
1	10.353	18 58 24.9	36.73	14 58.57	0.496	16 12.78	1 8.78	15 44 43.95
3	10.388	19 12 56.1	35.87	14 46.25	0.530	16 12.99	1 8.89	15 48 40.51
6	10.422	19 27 6.6	35.00	14 33.12	0.564	16 13.20	1 9.00	15 52 37.07
8	10.455	19 40 56.0	34.11	14 19.19	0.597	16 13.40	1 9.12	15 56 33.62
0	10.488	−19 54 23.9	−33.21	−14 4.47	+0.630	16 13.60	1 9.23	16 0 30.18
1	10.521	20 7 29.9	32.29	13 48.96	0.662	16 13.80	1 9.34	16 4 26.74
9	10.553	20 20 13.7	31.36	13 32.68	0.694	16 14.00	1 9.45	16 8 23.29
3	10.585	20 32 35.1	30.41	13 15.65	0.726	16 14.18	1 9.56	16 12 19.85
2	10.615	20 44 33.5	29.45	12 57.86	0.757	16 14.37	1 9.66	16 16 16.41
6	10.646	−20 56 8.6	−28.48	−12 39.33	+0.787	16 14.55	1 9.76	16 20 12.97
2	10.676	21 7 20.3	27.49	12 20.07	0.817	16 14.73	1 9.86	16 24 9.52
0	10.705	21 18 8.3	26.49	12 0.09	0.847	16 14.89	1 9.96	16 28 6.08
0	10.735	21 28 32.1	25.48	11 39.41	0.876	16 15.05	1 10.06	16 32 2.64
8	10.763	21 38 31.4	24.46	11 18.05	0.904	16 15.21	1 10.15	16 35 59.19
5	10.791	−21 48 6.0	−23.42	−10 56.00	+0.932	16 15.37	1 10.24	16 39 55.75
7	10.819	21 57 15.5	22.37	10 33.31	0.959	16 15.52	1 10.33	16 43 52.31
3	10.845	22 5 59.7	21.31	10 9.97	0.985	16 15.66	1 10.41	16 47 48.87
2	10.870	22 14 18.3	20.24	9 46.01	1.010	16 15.80	1 10.49	16 51 45.43
9	10.894	22 22 11.1	19.16	9 21.46	1.035	16 15.93	1 10.57	16 55 41.98
5	10.918	−22 29 37.8	−18.06	− 8 56.33	+1.058	16 16.06	1 10.64	16 59 38.54
4	10.940	22 36 38.2	16.96	8 30.66	1.080	16 16.18	1 10.70	17 3 35.10
6	10.961	22 43 11.8	15.85	8 4.46	1.101	16 16.30	1 10.77	17 7 31.66
8	10.981	22 49 18.8	14.73	7 37.78	1.121	16 16.41	1 10.83	17 11 28.22
5	11.000	22 54 58.8	13.60	7 10.64	1.140	16 16.52	1 10.89	17 15 24.77
6	11.016	−23 0 11.5	−12.46	− 6 43.07	+1.157	16 16.63	1 10.95	17 19 21.33
5	11.032	23 4 56.9	11.31	6 15.10	1.173	16 16.73	1 11.00	17 23 17.89
2	11.047	23 9 14.8	10.16	5 46.78	1.187	16 16.84	1 11.04	17 27 14.45
0	11.060	23 13 5.0	9.01	5 18.12	1.200	16 16.93	1 11.08	17 31 11.01
58	11.071	23 16 27.3	7.86	4 49.18	1.211	16 17.03	1 11.12	17 35 7.56
12	11.081	−23 19 21.7	− 6.69	− 4 19.99	+1.221	16 17.12	1 11.16	17 39 4.12
16	11.088	23 21 48.2	5.52	3 50.59	1.228	16 17.20	1 11.18	17 43 0.68
38	11.095	23 23 46.6	4.35	3 21.00	1.235	16 17.29	1 11.20	17 46 57.24
3	11.100	23 25 16.7	3.17	2 51.29	1.240	16 17.36	1 11.22	17 50 53.80
19	11.104	23 26 18.7	2.00	2 21.47	1.244	16 17.43	1 11.24	17 54 50.36
3	11.106	−23 26 52.4	− 0.82	− 1 51.58	+1.246	16 17.50	1 11.25	17 58 46.91
58	11.106	23 26 57.9	+ 0.36	1 21.67	1.246	16 17.57	1 11.25	18 2 43.47
14	11.106	23 26 35.1	1.54	0 51.75	1.246	16 17.63	1 11.25	18 6 40.03
37	11.103	23 25 44.1	2.71	− 0 21.86	1.243	16 17.68	1 11.25	18 10 36.59
12	11.100	23 24 24.8	3.89	+ 0 7.96	1.240	16 17.73	1 11.24	18 14 33.15
19	11.096	−23 22 37.4	+ 5.06	+ 0 37.68	+1.236	16 17.77	1 11.23	18 18 29.71
73	11.090	23 20 21.8	6.24	1 7.28	1.230	16 17.81	1 11.21	18 22 26.26
32	11.083	23 17 38.0	7.41	1 36.73	1.223	16 17.83	1 11.19	18 26 22.82
72	11.075	23 14 26.2	8.57	2 6.00	1.215	16 17.85	1 11.16	18 30 19.38
11	11.066	23 10 46.4	9.74	2 35.05	1.206	16 17.87	1 11.13	18 34 15.94
36	11.055	−23 6 38.8	+10.90	+ 3 3.87	+1.195	16 17.88	1 11.09	18 38 12.50

ime interval of semidiameter passing meridian, subtract 0s.19 from the sidereal interval.

FOR TRANSIT

Date.		Culmination.	Wash. Mean Time.
			h m
Jan.	1	U	6 57.09
	1	L	19 22.09
	2	U	7 46.85
	2	L	20 11.98
	3	U	8 37.47
	3	L	21 3.24
	4	U	9 29.21
	4	L	21 55.26
	5	U	10 21.24
	5	L	22 47.02
	6	U	11 12.46
	6	L	23 37.43
	7	U	12 1.86
	8	L	0 25.68
	8	U	12 48.87
	9	L	1 11.42
	9	U	[illegible]
	10	L	1 54.82
	10	U	14 15.79
	11	L	2 36.39
	11	U	14 56.72
	12	L	3 16.90
	12	U	15 37.05
	13	L	3 57.30
	13	U	16 17.77
	14	L	4 38.62
	14	U	16 59.99
	15	L	5 22.02
	[illegible]	U	17 44.87
	16	L	6 8.67
	16	U	18 33.55
	17	L	6 59.62
	17	U	19 26.94
	18	L	7 55.50
	18	U	20 25.23
	19	L	8 55.96
	19	U	21 27.46
	20	L	9 59.40
	20	U	22 31.43
	21	L	11 3.20
	21	U	23 34.13
	22	L	12 4.89
	23	U	0 34.45
	23	L	13 3.06
	24	U	1 30.75

Jan. 4, U Defective Illumination of N. 0''.83.
Jan. 5, U Defective Illumination of S. 0''.02.
Jan. 6, U Defective Illumination of S. 0''.21.
Jan. 7, U Defective Illumination of N. 0''.38.

T OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

ective *Illumination of S.* 0″.12.

Feb. 5, U Defective Illumination of S. 0″.34.

FOR TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON

Date.	Culmination.	Wash. Mean Time.	Var. per Hour of Long.	Right Ascension of Center.	Var. per Hour of Long.	Geocentric Declination of Center.	Var. per Hour of Long.	S. T. of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limb
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
Feb. 15	U	19 11.09	2.497	16 54 45.94	160.06	−25 31 47.9	− 79.9	74.17	16 1.2	58 41.7	II.
16	L	7 41.35	2.544	17 27 4.85	162.89	25 34 36.8	+ 52.9	74.83	16 8.6	59 8.9	
16	U	20 12.05	2.569	17 59 50.07	164.41	25 10 17.7	190.8	75.16	16 15.8	59 35.3	II.N
17	L	8 42.92	2.571	18 32 45.27	164.56	24 18 14.6	329.5	75.16	16 22.6	60 0.2	
17	U	21 13.68	2.552	19 5 34.18	163.39	−22 58 47.0	+ 464.1	74.84	16 28.7	60 22.8	II.N
18	L	9 44.09	2.515	19 38 2.32	161.14	21 13 11.1	590.1	74.27	16 34.0	60 42.3	
18	U	22 13.97	2.464	20 9 58.45	158.12	19 3 34.7	703.5	73.51	16 38.3	60 58.0	II.N
19	L	10 43.20	2.407	20 41 15.26	154.64	16 32 49.7	801.1	72.63	16 41.4	61 9.3	
19	U	23 11.72	2.347	21 11 49.43	151.05	−13 44 20.0	+ 880.7	71.73	16 43.1	61 15.7	II.N
20	L	11 39.54	2.290	21 41 41.33	147.63	10 41 50.5	940.9	70.87	16 43.4	61 16.8	
21	U	0 6.71	2.239	22 10 54.21	144.58	7 29 16.3	981.4	70.10	16 42.3	61 12.5	
21	L	12 33.32	2.197	22 39 33.42	142.05	4 10 33.3	1002.5	69.46	16 39.7	61 3.0	
22	U	0 59.48	2.165	23 7 45.67	140.10	− 0 49 30.9	+1004.9	68.97	16 35.7	60 48.6	
22	L	13 25.31	2.143	23 35 38.25	138.77	+ 2 30 13.1	989.7	68.65	16 30.6	60 29.7	
23	U	1 50.94	2.131	0 3 18.60	138.05	5 45 16.7	958.3	68.49	16 24.4	60 7.0	I.
23	L	14 16.49	2.128	0 30 53.77	137.89	8 52 34.8	912.3	68.48	16 17.4	59 41.3	
24	U	2 42.05	2.133	0 58 29.97	138.21	+11 49 22.5	+ 853.5	68.59	16 9.8	59 13.3	I.
24	L	15 7.71	2.145	1 26 12.32	138.89	14 33 13.2	783.1	68.80	16 1.8	58 43.9	
25	U	3 33.54	2.160	1 54 4.50	139.82	17 1 59.8	703.0	69.08	15 53.7	58 13.8	I.
25	L	15 59.57	2.177	2 22 8.49	140.85	19 13 54.6	614.7	69.36	15 45.4	57 43.7	
26	U	4 25.79	2.193	2 50 24.46	141.79	+21 7 29.2	+ 520.0	69.63	15 37.3	57 14.2	I.
26	L	16 52.18	2.205	3 18 50.59	142.51	22 41 34.4	420.2	69.83	15 29.6	56 45.9	
27	U	5 18.68	2.211	3 47 23.32	142.86	23 55 21.7	317.3	69.94	15 22.4	56 19.3	I.
27	L	17 45.21	2.209	4 15 57.46	142.73	24 48 22.8	212.8	69.91	15 15.6	55 54.6	
28	U	6 11.65	2.197	4 44 26.71	142.04	+25 20 30.0	+ 108.6	69.74	15 9.5	55 32.2	I.
28	L	18 37.90	2.176	5 12 44.18	140.77	25 31 56.3	+ 6.3	69.41	15 4.1	55 12.2	
Mar. 1	U	7 3.84	2.146	5 40 43.01	138.95	25 23 13.0	− 92.8	68.92	14 59.3	54 54.7	I.
1	L	19 29.36	2.107	6 8 16.95	136.64	24 55 8.2	187.1	68.30	14 55.2	54 39.7	
2	U	7 54.39	2.063	6 35 20.86	133.96	+24 8 43.4	− 276.0	67.58	14 51.8	54 27.3	I.
2	L	20 18.85	2.014	7 1 51.05	131.04	23 5 10.7	358.4	66.78	14 49.1	54 17.4	
3	U	8 42.72	1.964	7 27 45.40	128.01	21 45 49.1	434.0	65.94	14 47.1	54 9.9	I.
3	L	21 5.99	1.914	7 53 3.39	124.99	20 12 2.4	502.6	65.10	14 45.7	54 4.7	
4	U	9 28.66	1.866	8 17 46.01	122.13	+18 25 15.6	− 564.0	64.29	14 44.9	54 1.7	I.
4	L	21 50.79	1.822	8 41 55.50	119.50	16 26 54.8	618.3	63.53	14 44.6	54 0.7	
5	U	10 12.42	1.784	9 5 35.23	117.19	14 18 24.5	665.6	62.86	14 44.8	54 1.6	I.
5	L	22 33.63	1.752	9 28 49.45	115.25	12 1 8.6	705.9	62.29	14 45.5	54 4.2	
6	U	10 54.49	1.727	9 51 43.04	113.76	+ 9 36 29.7	− 739.5	61.85	14 46.7	54 8.4	I.
6	L	23 15.11	1.710	10 14 21.50	112.74	7 5 49.5	766.1	61.54	14 48.2	54 14.1	
7	U	11 35.57	1.701	10 36 50.69	112.22	4 30 29.4	785.9	61.38	14 50.1	54 21.0	I.
7	L	23 55.98	1.701	10 59 16.85	112.23	+ 1 51 52.3	799.0	61.37	14 52.3	54 29.1	
8	U	12 16.44	1.711	11 21 46.41	112.80	− 0 48 38.2	− 804.9	61.53	14 54.8	54 38.3	I. II
9	L	0 37.07	1.730	11 44 26.05	113.92	3 29 35.1	803.2	61.85	14 57.6	54 48.6	
9	U	12 57.99	1.758	12 7 22.58	115.60	6 9 27.3	794.0	62.33	15 0.7	54 59.8	II
10	L	1 19.30	1.795	12 30 42.85	117.87	8 46 39.3	776.5	62.98	15 4.0	55 11.9	
10	*U*	13 41.11	1.842	12 54 33.66	120.60	−11 19 29.1	− 750.2	63.78	15 7.6	55 25.0	U

Mar. 1, U Defective Illumination of N. 0″.24.
Mar. 7, U Defective Illumination of N. 0″.12.
Mar. 8, U Defective Illumination of I. 0″.2

...T OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

	Var. per Hour of Long.	Right Ascension of Center.	Var. per Hour of Long.	Geocentric Declination of Center.	Var. per Hour of Long.	S. T. of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
11	1.842	12 54 33.66	120.60	−11 19 29.1	−750.2	63.78	15 7.6	55 25.0	II. S.
54	1.898	13 19 1.58	124.05	13 46 7.4	714.5	64.71	15 11.4	55 39.0	
69	1.962	13 44 12.73	127.89	16 4 37.6	668.7	65.77	15 15.4	55 53.9	II. S.
65	2.032	14 10 12.42	132.12	18 12 54.6	612.2	66.92	15 19.8	56 9.7	
49	2.107	14 37 4.76	136.64	−20 8 46.5	−544.4	68.13	15 24.3	56 26.5	II. S.
23	2.184	15 4 52.12	141.26	21 49 55.6	465.0	69.34	15 29.1	56 44.2	
90	2.259	15 33 34.61	145.79	23 14 1.9	374.1	70.52	15 34.2	57 2.8	II. S.
44	2.329	16 3 9.63	149.96	24 18 48.5	271.9	71.59	15 39.5	57 22.2	
75	2.389	16 33 31.54	153.56	−25 2 8.4	−159.8	72.50	15 45.0	57 42.3	II. S.
70	2.434	17 4 31.70	156.31	25 22 12.7	− 39.8	73.18	15 50.6	58 3.0	
11	2.463	17 35 58.96	158.06	25 17 39.8	+ 85.9	73.61	15 56.3	58 23.9	II. *N.* S.
75	2.474	18 7 40.54	158.70	24 47 41.4	213.8	73.77	16 2.1	58 44.9	
41	2.466	18 39 23.24	158.25	−23 52 10.2	+340.8	73.65	16 7.7	59 5.5	II. N.
88	2.443	19 10 54.79	156.86	22 31 40.2	463.1	73.29	16 13.1	59 25.2	
00	2.408	19 42 5.02	154.74	20 47 26.5	577.6	72.75	16 18.1	59 43.7	II. N.
64	2.365	20 12 46.62	152.14	18 41 20.1	681.5	72.08	16 22.6	60 0.3	
74	2.318	20 42 55.45	149.33	−16 15 43.2	+772.4	71.35	16 26.5	60 14.5	II. N.
28	2.272	21 12 30.59	146.55	13 33 21.4	848.6	70.63	16 29.6	60 25.8	
29	2.230	21 41 33.76	144.03	10 37 19.1	909.0	69.96	16 31.7	60 33.6	II. N.
83	2.195	22 10 8.90	141.91	7 30 52.1	952.6	69.38	16 32.7	60 37.6	
00	2.168	22 38 21.51	140.29	− 4 17 23.7	+979.1	68.95	16 32.7	60 37.4	II. N.
90	2.151	23 6 18.13	139.24	− 1 0 20.6	988.4	68.67	16 31.5	60 32.9	
65	2.143	23 34 5.69	138.78	+ 2 16 51.5	980.7	68.54	16 29.1	60 24.1	
36	2.145	0 1 51.12	138.80	5 30 51.0	956.5	68.55	16 25.5	60 11.1	
15	2.155	0 29 40.83	139.49	+ 8 38 23.9	+916.4	68.71	16 20.9	59 54.3	
10	2.171	0 57 40.33	140.49	11 36 26.1	861.6	68.97	16 15.5	59 34.2	
28	2.193	1 25 53.83	141.79	14 22 7.9	793.3	69.33	16 9.2	59 11.2	I. S.
74	2.217	1 54 23.83	143.22	16 52 56.1	712.9	69.71	16 2.3	58 46.0	
48	2.240	2 23 10.90	144.60	+19 6 37.5	+622.3	70.09	15 55.0	58 19.2	I. S.
48	2.259	2 52 13.42	145.76	21 1 21.2	523.7	70.41	15 47.5	57 51.7	
67	2.272	3 21 27.60	146.52	22 35 41.5	419.0	70.64	15 40.0	57 24.0	I. S.
96	2.275	3 50 47.65	146.72	23 48 40.3	310.5	70.73	15 32.6	56 56.7	
22	2.267	4 20 6.27	146.27	+24 39 47.8	+200.8	70.64	15 25.4	56 30.4	I. S.
32	2.248	4 49 15.23	145.11	25 9 1.8	+ 92.0	70.38	15 18.6	56 5.5	
13	2.217	5 18 6.17	143.27	25 16 46.7	− 13.8	69.94	15 12.3	55 42.5	I. S.
50	2.177	5 46 31.28	140.82	25 3 49.1	114.8	69.33	15 6.6	55 21.6	
34	2.128	6 14 24.02	137.90	+24 31 14.3	−209.9	68.60	15 1.6	55 3.2	I. N.
56	2.074	6 41 39.61	134.66	23 40 20.5	297.9	67.76	14 57.3	54 47.3	
11	2.018	7 8 15.08	131.24	22 32 34.5	378.5	66.86	14 53.7	54 34.1	I. N.
98	1.961	7 34 9.45	127.84	21 9 26.9	451.5	65.95	14 50.9	54 23.7	
18	1.906	7 59 23.51	124.55	+19 32 28.7	−516.9	65.04	14 48.7	54 15.9	I. N.
75	1.856	8 23 59.63	121.52	17 43 9.0	575.1	64.20	14 47.4	54 10.9	
75	1.811	8 48 1.37	118.83	15 42 53.6	626.3	63.44	14 46.7	54 8.5	I. N.
25	1.774	9 11 33.32	116.57	13 33 5.0	670.7	62.78	14 46.7	54 8.5	
35	*1.744*	*9 34 40.81*	*114.77*	+11 15 2.3	−708.7	62.24	14 47.4	54 10.9	I. N.

Mar. 15, U Defective Illumination of *N.* 0″.13.

FOR TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGT

Date.	Culmination.	Wash. Mean Time.	Var. per Hour of Long.	Right Ascension of Center.	Var. per Hour of Long.	Geocentric Declination of Center.	Var. per Hour of Long.	S. T. of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	B L
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
Apr. 2	U	8 51.35	1.744	9 34 40.81	114.77	+11 15 2.3	−708.7	62.24	14 47.4	54 10.9	I.
2	L	21 12.13	1.723	9 57 29.69	113.47	8 50 2.2	740.4	61.84	14 48.6	54 15.5	
3	U	9 32.71	1.710	10 20 6.25	112.71	6 19 19.8	765.8	61.59	14 50.4	54 22.1	I.
3	L	21 53.20	1.706	10 42 37.06	112.51	3 44 11.4	784.7	61.50	14 52.7	54 30.5	
4	U	10 13.70	1.712	11 5 8.92	112.88	+ 1 5 54.4	−797.0	61.58	14 55.5	54 40.5	I.
4	L	22 34.34	1.728	11 27 48.74	113.85	− 1 34 9.4	802.4	61.82	14 58.5	54 51.8	
5	U	10 55.23	1.754	11 50 43.58	115.39	4 14 33.9	800.3	62.22	15 1.9	55 4.3	I.
5	L	23 16.48	1.780	12 14 0.46	117.52	6 53 45.7	790.2	62.80	15 5.6	55 17.8	
6	U	11 38.21	1.834	12 37 46.36	120.22	− 9 30 3.3	−771.2	63.53	15 9.5	55 32.1	I.
7	L	0 0.54	1.888	13 2 7.96	123.47	12 1 36.4	742.6	64.40	15 13.5	55 46.9	
7	U	12 23.56	1.950	13 27 11.45	127.20	14 26 24.5	703.6	65.41	15 17.7	56 2.0	II.
8	L	0 47.37	2.019	13 53 2.21	131.32	16 42 17.8	653.3	66.50	15 21.8	56 17.4	
8	U	13 12.04	2.092	14 19 44.35	135.73	−18 46 58.0	−591.3	67.67	15 26.1	56 32.9	II.
9	L	1 37.59	2.167	14 47 20.30	140.26	20 38 0.8	517.1	68.85	15 30.3	56 48.3	
9	U	14 4.05	2.241	15 15 50.17	144.68	22 12 59.9	430.7	70.00	15 34.5	57 3.7	II.
10	L	2 31.35	2.309	15 45 11.29	148.76	23 29 32.9	333.0	71.05	15 38.6	57 18.9	
10	U	14 59.42	2.367	16 15 18.06	152.24	−24 25 28.9	−224.8	71.94	15 42.7	57 33.8	II.
11	L	3 28.10	2.411	16 46 1.77	154.89	24 58 56.3	−108.6	72.62	15 46.7	57 48.5	
11	U	15 57.20	2.438	17 17 11.22	156.51	25 8 31.9	+ 13.2	73.05	15 50.6	58 2.9	II.
12	L	4 26.52	2.446	17 48 33.52	157.02	24 53 27.7	137.6	73.20	15 54.4	58 17.0	
12	U	16 55.84	2.436	18 19 55.41	156.45	−24 13 34.3	+260.9	73.09	15 58.1	58 30.5	II.
13	L	5 24.94	2.411	18 51 4.47	154.92	23 9 22.9	380.0	72.73	16 1.7	58 43.6	
13	U	17 53.65	2.373	19 21 50.40	152.64	21 42 1.4	492.1	72.18	16 5.1	58 56.0	II.
14	L	6 21.86	2.327	19 52 5.74	149.87	19 53 9.5	594.8	71.50	16 8.2	59 7.5	
14	U	18 49.49	2.277	20 21 46.24	146.87	−17 44 51.2	+686.2	70.75	16 11.1	59 18.0	II.
15	L	7 16.52	2.228	20 50 50.82	143.91	15 19 29.5	765.2	69.99	16 13.6	59 27.3	
15	U	19 42.98	2.183	21 19 21.23	141.21	12 39 39.0	830.9	69.28	16 15.7	59 35.0	II.
16	L	8 8.94	2.145	21 47 21.43	138.91	9 48 2.8	882.8	68.67	16 17.3	59 40.9	
16	U	20 34.50	2.116	22 14 57.14	137.14	− 6 47 29.2	+920.3	68.18	16 18.3	59 44.7	II.
17	L	8 59.76	2.096	22 42 15.17	135.97	3 40 49.7	943.7	67.85	16 18.7	59 46.1	
17	U	21 24.85	2.087	23 9 22.99	135.44	− 0 30 58.3	952.4	67.68	16 18.4	59 44.9	II.
18	L	9 49.90	2.089	23 36 28.30	135.55	+ 2 39 9.2	946.4	67.68	16 17.3	59 40.9	
18	U	22 15.03	2.101	0 3 38.56	136.26	+ 5 46 36.6	+925.7	67.84	16 15.5	59 34.1	II.
19	L	10 40.35	2.122	0 31 0.61	137.50	8 48 27.8	890.4	68.13	16 12.8	59 24.3	
19	U	23 5.97	2.150	0 58 40.33	139.18	11 41 49.3	840.9	68.55	16 9.4	59 11.7	
20	L	11 31.96	2.182	1 26 42.12	141.15	14 23 53.2	777.6	69.04	16 5.2	58 56.4	
20	U	23 58.36	2.217	1 55 8.53	143.26	+16 51 59.9	+701.5	69.57	16 0.4	58 38.7	
21	L	12 25.17	2.251	2 23 59.89	145.28	19 3 13.8	614.0	70.08	15 55.0	58 19.0	
22	U	0 52.36	2.280	2 53 14.05	147.01	20 56 57.4	516.8	70.52	15 49.2	57 57.6	
22	L	13 19.85	2.300	3 22 46.22	148.26	22 29 56.9	412.0	70.85	15 43.0	57 35.1	
23	U	1 47.52	2.310	3 52 29.28	148.81	+23 41 27.5	+302.4	71.01	15 36.7	57 11.9	I.
23	L	14 15.22	2.305	4 22 14.23	148.55	24 30 45.4	190.5	70.98	15 30.4	56 48.6	
24	U	2 42.79	2.287	4 51 50.95	147.43	24 57 40.7	+ 79.0	70.74	15 24.1	56 25.7	I.
24	L	15 10.05	2.254	5 21 9.19	145.48	25 2 35.0	− 29.3	70.29	15 18.1	56 3.5	
25	*U*	*3 36.84*	2.209	5 49 59.51	142.80	+24 46 18.6	−132.4	69.65	15 12.4	55 42.6	I.

April 5, U Defective Illumination of S. 0″.24.

April 12, U Defective Illumination of S. 0″.2

RANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

	Wash. Mean Time.	Var. per Hour of Long.	Right Ascension of Center.	Var. per Hour of Long.	Geocentric Declination of Center.	Var. per Hour of Long.	S. T. of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
	h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
U	3 36.84	2.209	5 49 59.51	142.80	+24 46 18.6	−132.4	69.65	15 12.4	55 42.6	I. S.
L	16 3.04	2.156	6 18 14.11	139.56	24 10 4.4	228.7	68.85	15 7.1	55 23.4	
U	4 28.55	2.096	6 45 47.32	135.93	23 15 21.8	317.1	67.95	15 2.4	55 6.0	I. N.
L	16 53.32	2.033	7 12 35.84	132.14	22 3 49.0	397.0	66.99	14 58.3	54 50.9	
U	5 17.33	1.970	7 38 38.71	128.36	+20 37 8.4	−468.4	66.01	14 54.8	54 38.3	I. N.
L	17 40.60	1.910	8 3 57.12	124.75	18 57 1.1	531.4	65.06	14 52.1	54 28.2	
U	6 3.18	1.855	8 28 33.96	121.45	17 5 4.0	586.7	64.17	14 50.1	54 20.8	I. N.
L	18 25.15	1.807	8 52 33.54	118.56	15 2 48.2	634.7	63.38	14 48.8	54 16.1	
U	6 46.58	1.767	9 16 1.23	116.15	+12 51 38.4	−675.8	62.70	14 48.3	54 14.2	I. N.
L	19 7.58	1.736	9 39 3.15	114.27	10 32 53.6	710.6	62.16	14 48.5	54 15.1	
U	7 28.27	1.714	10 1 45.96	112.97	. 8 7 48.0	739.3	61.78	14 49.5	54 18.6	I. N.
L	19 48.75	1.702	10 24 16.77	112.27	5 37 33.2	762.2	61.56	14 51.1	54 24.7	
U	8 9.16	1.701	10 46 42.86	112.19	+ 3 3 18.9	−779.2	61.50	14 53.4	54 33.2	I. N.
L	20 29.62	1.710	11 9 11.82	112.74	+ 0 26 16.7	790.1	61.63	14 56.4	54 44.0	
U	8 50.25	1.730	11 31 51.32	113.95	− 2 12 18.4	794.6	61.94	14 59.9	54 56.8	I. N.
L	21 11.18	1.761	11 54 49.14	115.80	4 51 5.3	792.0	62.42	15 3.9	55 11.4	
U	9 32.55	1.802	12 18 13.08	118.30	− 7 28 35.2	−781.5	63.08	15 8.3	55 27.6	I. N.
L	21 54.48	1.854	12 42 10.81	121.43	10 3 8.8	762.5	63.90	15 13.0	55 44.9	
U	10 17.10	1.916	13 6 49.65	125.14	12 32 54.6	733.4	64.88	15 18.0	56 3.2	I. N.
L	22 40.51	1.987	13 32 16.35	129.39	14 55 47.9	693.5	65.98	15 23.1	56 22.0	
U	11 4.81	2.064	13 58 36.61	134.05	−17 9 30.7	−641.5	67.18	15 28.3	56 41.1	I. *N*. S.
L	23 30.06	2.146	14 25 54.58	138.98	19 11 33.2	576.6	68.44	15 33.5	57 0.1	
U	11 56.31	2.229	14 54 12.15	143.95	20 59 16.5	498.3	69.69	15 38.5	57 18.6	I. II. S.
L	0 23.54	2.308	15 23 28.39	148.71	22 29 59.4	406.6	70.88	15 43.3	57 36.3	
U	12 51.67	2.378	15 53 38.90	152.94	−23 41 5.6	−302.4	71.94	15 47.9	57 53.1	II. S.
L	1 20.56	2.435	16 24 35.60	156.35	24 30 15.1	187.6	72.79	15 52.1	58 8.5	
U	13 50.03	2.474	16 56 6.98	158.67	24 55 34.8	− 64.7	73.37	15 55.9	58 22.5	II. S.
L	2 19.84	2.491	17 27 58.74	159.73	24 55 49.5	+ 62.7	73.65	15 59.3	58 35.0	
U	14 49.73	2.487	17 59 55.31	159.47	−24 30 29.0	+190.5	73.63	16 2.3	58 45.8	II. *N*. S.
L	3 19.44	2.462	18 31 41.35	158.01	23 39 51.4	314.8	73.31	16 4.8	58 55.0	
U	15 48.76	2.421	19 3 3.39	155.52	22 25 0.9	432.1	72.73	16 6.8	59 2.5	II. N.
L	4 17.51	2.368	19 33 51.02	152.32	20 47 40.4	539.5	71.98	16 8.4	59 8.4	
U	16 45.57	2.308	20 3 57.58	148.73	−18 50 2.5	+634.7	71.12	16 9.6	59 12.8	II. N.
L	5 12.90	2.247	20 33 20.20	145.05	16 34 39.5	716.9	70.22	16 10.4	59 15.7	
U	17 39.51	2.189	21 1 59.50	141.55	14 4 13.7	785.2	69.34	16 10.8	59 17.2	II. N.
L	6 5.46	2.137	21 29 58.92	138.44	11 21 31.7	839.5	68.56	16 10.9	59 17.3	
U	18 30.83	2.094	21 57 24.04	135.86	− 8 29 19.2	+880.3	67.89	16 10.6	59 16.2	II. N.
L	6 55.76	2.062	22 24 21.96	133.91	5 30 18.6	907.7	67.37	16 9.9	59 13.8	
U	19 20.37	2.041	22 51 0.70	132.67	− 2 27 8.9	921.8	67.03	16 8.9	59 10.0	II. N.
L	7 44.80	2.032	23 17 28.71	132.12	+ 0 37 34.2	923.3	66.87	16 7.5	59 4.9	
U	20 9.19	2.035	23 43 54.47	132.29	+ 3 41 17.4	+911.8	66.88	16 5.7	58 58.5	II. N.
L	8 33.68	2.049	0 10 26.16	133.11	6 41 29.0	887.9	67.07	16 3.6	58 50.6	
U	20 58.39	2.072	0 37 11.32	134.51	9 35 37.6	851.4	67.41	16 1.1	58 41.3	II. N.
L	9 23.43	2.103	1 4 16.40	136.41	12 21 12.5	802.4	67.87	15 58.1	58 30.4	
U	*21 48.89*	*2.141*	*1 31 46.45*	138.65	+14 55 45.4	+741.1	68.41	15 54.8	58 18.2	II. N.

5, U Defective Illumination of N. 0″.11.

May 9, U Defective Illumination of N. 0″.23.

FOR TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGT

Date.	Culmination.	Wash. Mean Time.	Var. per Hour of Long	Right Ascension of Center.	Var. per Hour of Long.	Geocentric Declination of Center.	Var. per Hour of Long.	S. T. of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Li
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
May 17	U	21 48.89	2.141	1 31 46.45	138.65	+14 55 45.4	+741.1	68.41	15 54.8	58 18.2	II.
18	L	10 14.82	2.181	1 59 44.64	141.06	17 16 51.6	668.1	69.00	15 51.0	58 4.5	
18	U	22 41.23	2.220	2 28 11.93	143.45	19 22 14.2	584.0	69.58	15 46.9	57 49.5	II.
19	L	11 8.10	2.256	2 57 6.62	145.59	21 9 48.9	490.3	70.10	15 42.5	57 33.3	
19	U	23 35.35	2.284	3 26 24.31	147.25	+22 37 49.9	+388.6	70.51	15 37.8	57 16.1	
20	L	12 2.86	2.300	3 55 57.95	148.22	23 44 55.3	281.5	70.74	15 32.9	56 58.1	
21	U	0 30.49	2.302	4 25 38.30	148.35	24 30 12.7	171.2	70.78	15 27.9	56 39.7	
21	L	12 58.05	2.289	4 55 14.68	147.56	24 53 22.0	+ 60.6	70.60	15 22.9	56 21.1	
22	U	1 25.36	2.260	5 24 36.02	145.85	+24 54 37.2	− 47.5	70.20	15 17.8	56 2.6	I.
22	L	13 52.24	2.219	5 53 31.85	143.33	24 34 42.4	150.7	69.59	15 12.9	55 44.7	
23	U	2 18.56	2.166	6 21 53.26	140.15	23 54 48.0	247.2	68.82	15 8.3	55 27.6	I.
23	L	14 44.19	2.105	6 49 33.53	136.51	22 56 24.1	335.4	67.92	15 3.9	55 11.6	
24	U	3 9.06	2.041	7 16 28.50	132.64	+21 41 13.3	−414.9	66.95	15 0.0	54 57.1	I.
24	L	15 33.16	1.976	7 42 36.54	128.72	20 11 3.4	485.2	65.95	14 56.5	54 44.3	
25	U	3 56.49	1.913	8 7 58.35	124.95	18 27 43.0	546.7	64.98	14 53.5	54 33.5	I.
25	L	16 19.09	1.855	8 32 36.57	121.48	16 32 55.5	599.9	64.07	14 51.2	54 24.9	
26	U	4 41.04	1.804	8 56 35.41	118.40	+14 28 18.9	−645.1	63.26	14 49.5	54 18.7	I.
26	L	17 2.43	1.761	9 20 0.29	115.83	12 15 23.2	683.1	62.56	14 48.5	54 15.0	
27	U	5 23.35	1.728	9 42 57.46	113.80	9 55 31.3	714.5	62.01	14 48.2	54 13.9	I.
27	L	17 43.93	1.704	10 5 33.83	112.37	7 29 59.0	730.8	61.62	14 48.6	54 15.5	
28	U	6 4.28	1.690	10 27 56.74	111.56	+ 4 59 58.0	−759.4	61.39	14 49.8	54 19.9	I.
28	L	18 24.54	1.688	10 50 13.84	111.41	+ 2 26 36.2	773.3	61.35	14 51.8	54 27.0	
29	U	6 44.84	1.696	11 12 33.08	111.92	− 0 8 58.5	781.5	61.48	14 54.4	54 36.8	I.
29	L	19 5.30	1.716	11 35 2.60	113.12	2 45 36.5	783.3	61.80	14 57.8	54 49.1	
30	U	7 26.07	1.748	11 57 50.69	115.02	− 5 22 3.8	−779.6	62.31	15 1.8	55 3.9	I.
30	L	19 47.29	1.791	12 21 5.74	117.61	7 56 58.9	768.2	63.01	15 6.5	55 21.0	
31	U	8 9.10	1.846	12 44 56.12	120.90	10 28 50.1	748.8	63.89	15 11.7	55 40.0	I.
31	L	20 31.63	1.911	13 9 30.00	124.86	12 55 52.7	719.9	64.92	15 17.3	56 0.8	
June 1	U	8 55.02	1.987	13 34 55.06	129.42	−15 16 7.6	−680.6	66.10	15 23.4	56 23.0	I.
1	L	21 19.36	2.071	14 1 17.95	134.47	17 27 19.7	629.3	67.40	15 29.7	56 46.1	
2	U	9 44.75	2.161	14 28 43.86	139.88	19 26 58.0	564.8	68.76	15 36.1	57 9.8	I.
2	L	22 11.24	2.253	14 57 15.61	145.41	21 12 18.4	486.3	70.13	15 42.6	57 33.5	
3	U	10 38.81	2.342	15 26 52.96	150.75	−22 40 29.5	−393.3	71.43	15 48.9	57 56.7	I.
3	L	23 7.41	2.422	15 57 31.73	155.58	23 48 40.7	286.5	72.60	15 55.0	58 18.9	
4	U	11 36.89	2.488	16 29 3.47	159.53	24 34 15.5	167.5	73.54	16 0.6	58 39.6	I.
5	L	0 7.03	2.533	17 1 15.53	162.26	24 55 4.8	− 39.5	74.19	16 5.7	58 58.3	
5	U	12 37.58	2.555	17 33 51.86	163.55	−24 49 11.4	+ 93.8	74.50	16 10.1	59 14.6	II.
6	L	1 8.24	2.551	18 6 34.58	163.32	24 17 30.7	227.7	74.46	16 13.8	59 28.2	
6	U	13 38.71	2.524	18 39 5.98	161.69	23 18 55.0	357.2	74.09	16 16.7	59 38.9	II.
7	L	2 8.73	2.477	19 11 10.39	158.88	21 55 12.6	478.1	73.44	16 18.8	59 46.4	
7	U	14 38.10	2.416	19 42 35.73	155.24	−20 8 28.6	+586.9	72.59	16 20.0	59 50.9	II.
8	L	3 6.69	2.348	20 13 14.30	151.14	18 1 23.2	681.4	71.62	16 20.4	59 52.3	
8	U	15 34.45	2.279	20 43 2.78	146.95	15 36 57.5	760.2	70.61	16 20.1	59 51.0	II.
9	L	4 1.39	2.212	21 12 1.80	142.95	12 58 23.1	822.9	69.64	16 19.0	59 47.0	
9	U	16 27.57	2.153	21 40 15.16	139.37	−10 8 51.5	+869.8	68.75	16 17.3	59 40.8	II

June 4, U Defective Illumination of N. 0″.98.
June 5, U Defective Illumination of N. 0″.93.

June 6, U Defective Illumination of S. 0″ ...

[TRAN]SIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Bright limb.
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July 2, U Defective Illumination of *N.* 0″.01.

FOR TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON

July 2, U Defective Illumination of N. 0".01.

July 3, U Defective Illumination of N. 0"

TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Culmination.	Wash. Mean Time.	Var. per Hour of Long.	Right Ascension of Center.	Var. per Hour of Long.	Geocentric Declination of Center.	Var. per Hour of Long.	S. T. of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
	h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
U	4 41.39	1.798	12 53 29.96	118.02	−11 23 17.3	−712.1	63.17	14 59.4	54 55.0	I. N.
L	17 3.30	1.856	13 17 26.47	121.50	13 42 37.9	680.0	64.14	15 4.2	55 12.5	
U	5 25.97	1.924	13 42 8.57	125.61	15 54 41.2	639.0	65.26	15 9.6	55 32.5	I. N.
L	17 49.51	2.001	14 7 43.22	130.26	17 57 34.9	588.3	66.50	15 15.7	55 54.8	
U	6 14.03	2.086	14 34 16.39	135.34	−19 49 14.4	−526.5	67.82	15 22.4	56 19.3	I. N.
L	18 39.59	2.175	15 1 52.48	140.70	21 27 21.4	452.6	69.19	15 29.6	56 45.7	
U	7 6.23	2.265	15 30 33.56	146.13	22 49 27.0	366.2	70.54	15 37.2	57 13.7	I. N.
L	19 33.93	2.352	16 0 18.72	151.34	23 52 56.8	266.7	71.81	15 45.2	57 43.0	
U	8 2.63	2.429	16 31 3.44	156.01	−24 35 18.4	−154.9	72.92	15 53.3	58 12.9	I. N.
L	20 32.17	2.492	17 2 39.26	159.79	24 54 12.4	− 32.5	73.81	16 1.5	58 42.9	
U	9 2.36	2.536	17 34 54.00	162.45	24 47 46.4	+ 97.9	74.41	16 9.5	59 12.3	I. N. S.
L	21 32.96	2.558	18 7 32.75	163.78	24 14 47.2	232.3	74.69	16 17.1	59 40.2	
U	10 3.67	2.558	18 40 19.17	163.73	−23 14 51.8	+366.4	74.65	16 24.1	60 5.9	I. N. S.
L	22 34.26	2.536	19 12 57.38	162.44	21 48 33.9	495.3	74.32	16 30.3	60 28.6	
U	11 4.47	2.498	19 45 13.59	160.12	19 57 23.7	614.4	73.75	16 35.5	60 47.5	I. N. S.
L	23 34.15	2.447	20 16 57.39	157.00	17 43 41.3	720.1	73.00	16 39.4	61 2.0	
U	12 3.18	2.391	20 48 2.27	153.60	−15 10 27.5	+809.3	72.17	16 42.0	61 11.6	I. *II.* N. *S.*
L	0 31.52	2.333	21 18 25.78	150.24	12 21 11.4	880.2	71.32	16 43.2	61 16.0	
U	12 59.19	2.279	21 48 8.86	147.00	9 19 38.2	932.1	70.53	16 43.0	61 15.2	II. N.
L	1 26.25	2.232	22 17 15.25	144.16	6 9 38.9	964.7	69.84	16 41.4	61 9.2	
U	13 52.80	2.194	22 45 50.64	141.85	− 2 55 0.6	+978.7	69.27	16 38.4	60 58.3	II. N.
L	2 18.95	2.166	23 14 1.92	140.15	+ 0 20 39.0	975.1	68.86	16 34.2	60 43.1	
U	14 44.82	2.148	23 41 56.58	139.07	3 33 55.7	955.1	68.62	16 29.1	60 24.2	II. N.
L	3 10.53	2.140	0 9 42.11	138.62	6 41 41.8	920.2	68.53	16 23.1	60 2.3	
U	15 36.21	2.142	0 37 25.54	138.71	+ 9 41 6.1	+871.7	68.58	16 16.5	59 38.0	II. N.
L	4 1.97	2.151	1 5 13.14	139.20	12 29 34.8	811.1	68.76	16 9.5	59 12.1	
U	16 27.87	2.167	1 33 9.90	140.22	15 4 50.6	739.8	69.02	16 2.2	58 45.3	II. N.
L	4 53.98	2.186	2 1 19.29	141.37	17 24 52.6	659.1	69.33	15 54.8	58 18.2	
U	17 20.33	2.206	2 29 43.00	142.58	+19 27 56.2	+570.3	69.64	15 47.4	57 51.3	II. N.
L	5 46.92	2.224	2 58 20.71	143.67	21 12 34.1	475.0	69.92	15 40.3	57 25.1	
U	18 13.70	2.238	3 27 10.02	144.49	22 37 36.8	374.7	70.12	15 33.4	56 59.9	II. N.
L	6 40.59	2.244	3 56 6.53	144.86	23 42 14.4	271.1	70.20	15 26.9	56 36.1	
U	19 7.51	2.241	4 25 4.25	144.66	+24 25 58.6	+166.1	70.14	15 20.9	56 13.8	II. N.
L	7 34.33	2.227	4 53 55.94	143.84	24 48 43.1	+ 61.5	69.91	15 15.3	55 53.2	
U	20 0.92	2.203	5 22 33.85	142.38	24 50 44.5	− 40.8	69.50	15 10.1	55 34.3	II. N.
L	8 27.15	2.168	5 50 50.41	140.29	24 32 39.8	139.2	68.94	15 5.4	55 17.2	
U	20 52.91	2.125	6 18 38.78	137.70	+23 55 25.7	−232.2	68.25	15 1.3	55 1.9	II. S.
L	9 18.12	2.075	6 45 53.52	134.71	23 0 14.1	318.6	67.44	14 57.6	54 48.3	
U	21 42.70	2.021	7 12 30.78	131.47	21 48 28.7	397.7	66.56	14 54.3	54 36.4	II. S.
L	10 6.63	1.966	7 38 28.46	128.14	20 21 41.3	468.9	65.65	14 51.5	54 26.1	
U	22 29.89	1.911	8 3 46.24	124.84	+18 41 27.8	−532.1	64.74	14 49.1	54 17.4	II. S.
L	10 52.50	1.859	8 28 25.34	121.71	16 49 25.6	587.0	63.88	14 47.2	54 10.2	
U	23 14.52	1.811	8 52 28.28	118.83	14 47 10.5	634.2	63.08	14 45.6	54 4.4	
L	11 36.00	1.769	9 15 58.70	116.30	12 36 16.5	673.6	62.37	14 44.4	54 0.0	
U	*23 57.01*	*1.734*	*9 39 1.08*	*114.18*	+10 18 13.8	−705.7	61.77	14 43.6	53 57.1	

ly 31, U Defective Illumination of N. 1″.00.
g. 1, U Defective Illumination of N. 0″.56.

Aug. 2, U Defective Illumination of II. 0″.00.
Aug. 2, U Defective Illumination of S. 0″.30.

FOR TRANSI

Date.	Culmination.	Wasl Mea Time
		h m
Aug. 16	U	23 57
17	L	12 17
18	U	0 37
18	L	12 58
19	U	1 18
19	L	13 38
20	U	1 58
20	L	14 19
21	U	2 39
21	L	15 1
22	U	3 23
22	L	15 45
23	U	4 8
23	L	16 33
24	U	4 58
24	L	17 24
25	U	5 51
25	L	18 19
26	U	6 47
26	L	19 17
27	U	7 46
27	L	20 16
28	U	8 46
28	L	21 15
29	U	9 44
29	L	22 13
30	U	10 41
30	L	23 9
31	U	11 36
Sept. 1	L	0 3
1	U	12 30
2	L	0 56
2	U	13 23
3	L	1 50
3	U	14 16
4	L	2 43
4	U	15 10
5	L	3 38
5	U	16 5
6	L	4 33
6	U	17 0
7	L	5 28
7	U	17 55
8	L	6 22
8	U	18 48

Aug. 27, U Defective Illumination of N. 0′′.29.

Aug. 31, U Defective Illumination of S

OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Sept. 30, U Defective illumination of *I.* 0s.04.

FOR TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGT

Oct. 5, U Defective Illumination of S. 0' 80.

OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Var. per Hour of Long.	Right Ascension of Center.	Var. per Hour of Long.	Geocentric Declination of Center.	Var. per Hour of Long.	S. T. of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
2.171	21 22 34.56	140.46	−11 33 18.3	+813.2	68.88	16 14.3	59 29.8	I. S.
2.150	21 50 31.96	139.18	8 45 18.3	864.6	68.53	16 18.2	59 44.2	
2.137	22 18 16.95	138.41	5 48 19.9	902.8	68.30	16 21.6	59 56.7	I. S.
2.133	22 45 55.98	138.20	− 2 45 5.3	927.2	68.22	16 24.4	60 6.8	
2.140	23 13 36.08	138.59	+ 0 21 34.7	+936.9	68.29	16 26.4	60 14.1	I. S.
2.156	23 41 24.50	139.58	3 28 40.5	931.4	68.51	16 27.5	60 18.2	
2.182	0 9 28.21	141.13	6 33 6.1	910.1	68.87	16 27.6	60 18.8	I. S.
2.216	0 37 53.42	143.15	9 31 39.9	872.8	69.36	16 26.8	60 15.6	
2.255	1 6 45.14	145.51	+12 21 8.8	+819.3	69.93	16 24.9	60 8.6	I. *N.* S.
2.297	1 36 6.50	148.05	14 58 22.2	750.3	70.55	16 21.9	59 57.8	
2.338	2 5 58.31	150.55	17 20 18.8	666.8	71.16	16 18.0	59 43.3	I. *II.* N.
2.375	2 36 18.63	152.76	19 24 14.2	570.4	71.70	16 13.1	59 25.5	
2.403	3 7 2.39	154.42	+21 7 48.4	+463.8	72.12	16 7.5	59 4.9	II. N.
2.417	3 38 1.58	155.30	22 29 13.8	349.5	72.34	16 1.2	58 41.9	
2.416	4 9 5.76	155.23	23 27 21.2	231.3	72.35	15 54.5	58 17.1	II. N.
2.398	4 40 2.87	154.12	24 1 43.8	+112.7	72.11	15 47.4	57 51.2	
2.362	5 10 40.45	151.98	+24 12 36.8	− 3.1	71.63	15 40.2	57 24.8	II. N.
2.312	5 40 46.83	148.94	24 0 53.1	113.1	70.92	15 33.1	56 58.5	
2.249	6 10 12.28	145.20	23 27 56.5	214.9	70.02	15 26.1	56 32.9	II. *N.* S.
2.179	6 38 49.62	140.97	22 35 32.7	307.4	68.99	15 19.4	56 8.5	
2.105	7 6 34.65	136.52	+21 25 39.7	−389.7	67.88	15 13.2	55 45.7	II. S.
2.031	7 33 25.93	132.05	20 0 20.3	461.8	66.75	15 7.5	55 24.9	
1.960	7 59 24.52	127.77	18 21 35.1	524.1	65.64	15 2.5	55 6.3	II. S.
1.894	8 24 33.55	123.81	16 31 18.4	577.2	64.60	14 58.1	54 50.1	
1.836	8 48 57.69	120.29	+14 31 15.4	−621.9	63.65	14 54.4	54 36.6	II. S.
1.786	9 12 42.69	117.29	12 23 2.6	659.0	62.83	14 51.5	54 25.9	
1.745	9 35 55.06	114.86	10 8 7.0	689.1	62.15	14 49.3	54 17.9	II. S.
1.715	9 58 41.77	113.02	7 47 48.0	713.0	61.61	14 47.8	54 12.6	
1.694	10 21 10.06	111.80	+ 5 23 18.8	−730.9	61.25	14 47.2	54 10.2	II. S.
1.684	10 43 27.32	111.19	2 55 49.1	743.1	61.06	14 47.3	54 10.4	
1.684	11 5 40.97	111.20	+ 0 26 26.3	749.7	61.03	14 48.0	54 13.1	II. S.
1.695	11 27 58.46	111.82	− 2 3 41.3	750.6	61.17	14 49.4	54 18.2	
1.716	11 50 27.17	113.06	− 4 33 23.0	−745.3	61.48	14 51.4	54 25.5	II. S.
1.746	12 13 14.35	114.90	7 1 22.8	733.6	61.96	14 53.9	54 34.9	
1.786	12 36 27.09	117.32	9 26 18.4	714.5	62.60	14 57.0	54 46.1	II. S.
1.835	13 0 12.13	120.27	11 46 39.4	687.5	63.37	15 0.4	54 58.9	
1.892	13 24 35.64	123.72	−14 0 45.3	−651.9	64.27	15 4.3	55 12.9	II. S.
1.957	13 49 43.03	127.58	16 6 46.3	606.5	65.27	15 8.4	55 28.0	
2.026	14 15 38.50	131.72	18 2 43.0	551.0	66.34	15 12.7	55 43.9	
2.097	14 42 24.71	136.00	19 46 28.2	484.7	67.43	15 17.2	56 0.2	
2.167	15 10 2.14	140.22	−21 15 51.2	−407.4	68.50	15 21.7	56 16.8	
2.233	15 38 28.92	144.17	22 28 41.8	319.3	69.50	15 26.2	56 33.3	
2.290	16 7 40.32	147.62	23 22 57.7	221.7	70.36	15 30.6	56 49.7	
2.335	16 37 28.81	150.33	23 56 52.1	116.1	71.05	15 35.0	57 5.6	
2.365	17 7 44.55	152.13	−24 9 2.2	− 4.9	71.52	15 39.2	57 20.9	I. N.

...ive Illumination of N. 0″.35.
...ive Illumination of II. 0″.04.

Nov. 2, U Defective Illumination of N. 0″.08.

FOR TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHING[TON]

Date.	Culmination.	Wash. Mean Time.	Var. per Hour of Long.	Right Ascension of Center.	Var. per Hour of Long.	Geocentric Declination of Center.	Var. per Hour of Long.	S. T. of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	
		h m	m	h m s	s	° ′ ″	″	s	′ ″	′ ″	
Nov. 16	U	1 26.71	2.365	17 7 44.55	152.13	−24 9 2.2	− 4.9	71.52	15 39.2	57 20.9	I.
16	L	13 55.19	2.378	17 38 15.87	152.92	23 58 36.1	+109.4	71.74	15 43.2	57 35.6	
17	U	2 23.72	2.374	18 8 50.55	152.70	23 25 17.1	223.5	71.72	15 47.0	57 49.6	I.
17	L	14 52.11	2.355	18 39 16.86	151.55	22 29 25.1	334.5	71.47	15 50.6	58 2.7	
18	U	3 20.19	2.324	19 9 24.74	149.66	−21 11 55.1	+439.4	71.04	15 53.9	58 14.9	I.
18	L	15 47.84	2.284	19 39 6.60	147.26	19 34 11.8	536.3	70.48	15 57.0	58 26.4	
19	U	4 14.98	2.239	20 8 17.76	144.58	17 38 3.4	623.3	69.84	15 59.9	58 37.0	I.
19	L	16 41.58	2.194	20 36 56.51	141.89	15 25 34.8	699.5	69.19	16 2.5	58 46.7	
20	U	5 7.66	2.153	21 5 3.90	139.38	−12 59 1.9	+764.0	68.57	16 4.9	58 55.5	I.
20	L	17 33.28	2.118	21 32 43.35	137.25	10 20 46.7	816.5	68.04	16 7.1	59 3.5	
21	U	5 58.52	2.091	22 0 0.06	135.62	7 33 14.3	856.8	67.62	16 9.0	59 10.4	I.
21	L	18 23.49	2.073	22 27 0.63	134.59	4 38 52.0	884.9	67.35	16 10.6	59 16.2	
22	U	6 48.31	2.067	22 53 52.60	134.19	− 1 40 8.8	+900.3	67.23	16 11.8	59 20.8	I.
22	L	19 13.13	2.072	23 20 43.91	134.48	+ 1 20 24.9	903.1	67.29	16 12.7	59 24.1	
23	U	7 38.07	2.087	23 47 42.69	135.43	4 20 14.4	892.9	67.52	16 13.2	59 25.7	I.
23	L	20 3.26	2.113	0 14 56.79	137.01	7 16 41.7	869.3	67.89	16 13.1	59 25.5	
24	U	8 28.83	2.149	0 42 33.32	139.16	+10 7 4.9	+832.2	68.40	16 12.5	59 23.3	I.
24	L	20 54.87	2.192	1 10 38.25	141.74	12 48 38.6	781.1	69.02	16 11.3	59 19.0	
25	U	9 21.45	2.239	1 39 15.89	144.58	15 18 35.9	716.2	69.71	16 9.6	59 12.5	I.
25	L	21 48.61	2.287	2 8 28.27	147.48	17 34 13.2	637.9	70.40	16 7.1	59 3.6	
26	U	10 16.34	2.333	2 38 14.70	150.20	+19 32 55.0	+547.1	71.05	16 4.1	58 52.3	I.
26	L	22 44.57	2.370	3 8 31.38	152.48	21 12 22.0	445.7	71.59	16 0.4	58 38.8	
27	U	11 13.19	2.396	3 39 11.24	154.03	22 30 38.9	335.9	71.95	15 56.1	58 23.1	I.
27	L	23 42.02	2.407	4 10 4.34	154.65	23 26 22.9	220.7	72.09	15 51.3	58 5.5	
28	U	12 10.87	2.399	4 40 58.57	154.20	+23 58 49.5	+103.6	71.99	15 46.1	57 46.4	
29	L	0 39.53	2.373	5 11 40.78	152.65	24 7 55.8	− 12.0	71.62	15 40.6	57 26.0	
29	U	13 7.77	2.331	5 41 58.08	150.07	23 54 19.5	123.0	71.01	15 34.8	57 4.9	
30	L	1 35.40	2.274	6 11 39.09	146.64	23 19 13.3	226.5	70.18	15 28.9	56 43.4	
30	U	14 2.29	2.206	6 40 34.94	142.59	+22 24 18.5	−320.9	69.20	15 23.1	56 22.0	
Dec. 1	L	2 28.33	2.133	7 8 39.71	138.17	21 11 33.6	404.8	68.11	15 17.4	56 1.2	
1	U	14 53.47	2.057	7 35 50.49	133.63	19 43 6.7	477.9	66.98	15 12.0	55 41.3	
2	L	3 17.71	1.984	8 2 7.30	129.20	18 1 6.7	540.4	65.87	15 7.0	55 22.7	
2	U	15 41.09	1.915	8 27 32.43	125.05	+16 7 37.3	−592.8	64.80	15 2.4	55 5.8	
3	L	4 3.69	1.852	8 52 10.04	121.30	14 4 34.7	636.1	63.82	14 58.3	54 50.9	
3	U	16 25.58	1.798	9 16 5.65	118.06	11 53 43.9	671.1	62.96	14 54.8	54 38.2	
4	L	4 46.89	1.754	9 39 25.74	115.38	9 36 40.0	698.4	62.25	14 52.0	54 27.9	
4	U	17 7.72	1.720	10 2 17.34	113.32	+ 7 14 47.8	−719.1	61.69	14 49.9	54 20.2	
5	L	5 28.20	1.696	10 24 47.86	111.87	4 49 24.3	733.7	61.30	14 48.6	54 15.3	
5	U	17 48.46	1.683	10 47 4.97	111.08	+ 2 21 40.1	742.7	61.08	14 48.0	54 13.1	
6	L	6 8.62	1.680	11 9 16.49	110.95	− 0 7 18.2	746.1	61.04	14 48.2	54 13.8	
6	U	18 28.83	1.689	11 31 30.22	111.45	− 2 36 25.6	−744.1	61.17	14 49.1	54 17.2	
7	L	6 49.20	1.708	11 53 54.02	112.62	5 4 35.7	736.6	61.49	14 50.8	54 23.5	
7	U	19 9.86	1.738	12 16 35.72	114.44	7 30 39.2	723.0	61.97	14 53.2	54 32.4	
8	L	7 30.96	1.779	12 39 43.04	116.89	9 53 20.7	702.7	62.62	14 56.3	54 43.8	
8	U	19 52.60	1.830	13 3 23.41	119.94	−12 11 16.3	−675.2	63.44	15 0.1	54 57.5	

Nov. 27, U Defective Illumination of S. 0″.04.
Nov. 28, U Defective Illumination of S. 0″.56.
Nov. 29, U Defective Illumination of S.
Nov. 30, U Defective Illumination of

OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

tive Illumination of N. 0″.00.
tive Illumination of II. 0″.05.

Dec. 27, U Defective Illumination of N. 0″.30.
Dec. 28, U Defective Illumination of N. 0″.38.

FOR TRANSIT AT WASHINGTON.

D

Jan

Fel

FOR TRANSIT AT WASHINGTON.

	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S. T. of Sem. Pass. Mer.	Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S. T. of Sem. Pass. Mer.
	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
	0 54 49.50	+ 5 7 36.7	6.7	2.5	0.17	May 16	23 52	3 31 2.07	+17 57 11.5	16.0	6.0	0.42
	1 2 15.08	6 4 30.1	6.7	2.5	0.17	17	23 46	3 28 58.23	17 32 12.5	16.0	6.0	0.42
	1 9 42.50	7 1 24.8	6.8	2.6	0.17	18	23 40	3 26 58.20	17 7 46.9	15.9	6.0	0.42
	1 17 11.18	7 58 10.2	6.8	2.6	0.17	19	23 34	3 25 4.07	16 44 11.5	15.9	6.0	0.42
	1 24 40.36	8 54 34.0	6.9	2.6	0.18	20	23 28	3 23 17.75	16 21 42.8	15.8	6.0	0.42
1	1 32 9.24	+ 9 50 23.9	7.0	2.6	0.18	21	23 23	3 21 40.98	+16 0 35.1	15.7	5.9	0.41
3	1 39 36.85	10 45 26.8	7.1	2.7	0.18	22	23 17	3 20 15.26	15 41 1.9	15.5	5.9	0.41
1	1 47 2.14	11 39 29.4	7.2	2.7	0.18	23	23 12	3 19 1.95	15 23 14.6	15.4	5.8	0.40
5	1 54 23.97	12 32 18.0	7.3	2.8	0.19	24	23 7	3 18 2.14	15 7 22.7	15.2	5.7	0.40
3	2 1 41.11	13 23 39.8	7.4	2.8	0.19	25	23 3	3 17 16.78	14 53 33.8	14.9	5.7	0.39
1	2 8 52.31	+14 13 22.1	7.5	2.9	0.19	26	22 58	3 16 46.59	+14 41 53.4	14.7	5.6	0.39
4	2 15 56.28	15 1 13.4	7.7	2.9	0.20	27	22 54	3 16 32.12	14 32 25.5	14.5	5.5	0.38
7	2 22 51.73	15 47 3.1	7.8	3.0	0.20	28	22 50	3 16 33.75	14 25 12.5	14.2	5.4	0.37
0	2 29 37.41	16 30 42.1	8.0	3.0	0.21	29	22 47	3 16 51.76	14 20 14.8	14.0	5.3	0.37
3	2 36 12.09	17 12 2.2	8.1	3.1	0.21	30	22 43	3 17 26.31	14 17 31.9	13.7	5.2	0.36
5	2 42 34.60	+17 50 57.1	8.3	3.2	0.22	31	22 40	3 18 17.43	+14 17 1.8	13.4	5.1	0.35
7	2 48 43.85	18 27 21.8	8.5	3.2	0.23	June 1	22 37	3 19 25.11	14 18 42.0	13.2	5.0	0.34
9	2 54 38.79	19 1 12.5	8.7	3.3	0.23	2	22 35	3 20 49.27	14 22 28.7	12.9	4.9	0.34
1	3 0 18.48	19 32 26.2	9.0	3.4	0.24	3	22 32	3 22 29.77	14 28 17.4	12.6	4.8	0.33
.3	3 5 41.98	20 1 1.7	9.2	3.5	0.25	4	22 30	3 24 26.45	14 36 3.3	12.3	4.7	0.32
.4	3 10 48.49	+20 26 58.1	9.5	3.6	0.25	5	22 29	3 26 39.13	+14 45 40.9	12.1	4.6	0.32
.5	3 15 37.23	20 50 15.4	9.7	3.7	0.26	6	22 27	3 29 7.68	14 57 4.7	11.8	4.5	0.31
15	3 20 7.48	21 10 53.8	10.0	3.8	0.27	7	22 26	3 31 51.89	15 10 8.9	11.5	4.4	0.30
15	3 24 18.61	21 28 54.2	10.2	3.9	0.28	8	22 25	3 34 51.60	15 24 46.7	11.3	4.3	0.30
15	3 28 10.00	21 44 17.8	10.5	4.0	0.28	9	22 24	3 38 6.65	15 40 52.1	11.0	4.2	0.29
15	3 31 41.12	+21 57 6.0	10.8	4.1	0.29	10	22 24	3 41 36.94	+15 58 18.5	10.8	4.1	0.28
14	3 34 51.53	22 7 20.2	11.1	4.2	0.30	11	22 24	3 45 22.33	16 16 59.0	10.5	4.0	0.28
13	3 37 40.76	22 15 1.9	11.4	4.3	0.31	12	22 24	3 49 22.76	16 36 46.9	10.3	3.9	0.27
12	3 40 8.53	22 20 12.5	11.7	4.5	0.32	13	22 24	3 53 38.18	16 57 35.2	10.1	3.8	0.27
10	3 42 14.58	22 22 54.2	12.1	4.6	0.33	14	22 25	3 58 8.56	17 19 16.9	9.9	3.7	0.26
8	3 43 58.77	+22 23 8.3	12.4	4.7	0.34	15	22 26	4 2 53.94	+17 41 44.8	9.6	3.7	0.26
5	3 45 21.10	22 20 56.8	12.7	4.8	0.35	16	22 27	4 7 54.30	18 4 51.3	9.4	3.6	0.25
2	3 46 21.69	22 16 22.3	13.0	4.9	0.35	17	22 28	4 13 9.74	18 28 28.7	9.2	3.5	0.25
59	3 47 0.81	22 9 27.5	13.3	5.1	0.36	18	22 30	4 18 40.31	18 52 28.9	9.0	3.4	0.24
55	3 47 18.91	22 0 15.7	13.6	5.2	0.37	19	22 31	4 24 26.11	19 16 43.8	8.8	3.4	0.24
51	3 47 16.68	+21 48 50.8	14.0	5.3	0.38	20	22 33	4 30 27.24	+19 41 4.6	8.7	3.3	0.23
47	3 46 54.94	21 35 18.1	14.2	5.4	0.39	21	22 36	4 36 43.75	20 5 22.2	8.5	3.2	0.23
42	3 46 14.77	21 19 43.8	14.5	5.5	0.39	22	22 38	4 43 15.73	20 29 27.1	8.3	3.2	0.23
37	3 45 17.48	21 2 15.3	14.8	5.6	0.40	23	22 41	4 50 3.21	20 53 9.2	8.1	3.1	0.22
32	3 44 4.56	20 43 1.8	15.0	5.7	0.40	24	22 44	4 57 6.19	21 16 18.1	8.0	3.0	0.22
27	3 42 37.76	+20 22 13.4	15.2	5.8	0.41	25	22 48	5 4 24.56	+21 38 42.6	7.9	3.0	0.22
21	3 40 58.99	20 0 2.7	15.4	5.9	0.42	26	22 51	5 11 58.15	22 0 11.2	7.7	2.9	0.21
16	3 39 10.33	19 36 42.5	15.6	5.9	0.42	27	22 55	5 19 46.70	22 20 32.3	7.6	2.9	0.21
10	3 37 13.98	19 12 29.0	15.7	6.0	0.42	28	22 59	5 27 49.76	22 39 33.6	7.5	2.8	0.21
4	3 35 12.25	18 47 37.6	15.8	6.0	0.42	29	23 3	5 36 6.79	22 57 2.7	7.3	2.8	0.20
58	*3 33 7.50*	*+18 22 25.8*	*15.9*	*6.0*	*0.42*	30	23 8	5 44 37.05	+23 12 47.6	7.2	2.8	0.20
2	*3 31 2.07*	*+17 57 11.5*	*16.0*	*6.0*	*0.42*	July 1	23 13	5 53 19.64	+23 26 36.5	7.1	2	

FOR TRANSIT AT WASHINGTON.

Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S. T. of Sem. Pass. Mer.	Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.
	h m	h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″
July 1	23 13	5 53 19.64	+23 26 36.5	7.1	2.7	0.20	Aug. 17	1 43	11 25 1.23	+2 26 47.9	8.8
2	23 18	6 2 13.42	23 38 17.9	7.1	2.7	0.20	18	1 43	11 28 59.79	1 50 26.7	8.9
3	23 23	6 11 17.14	23 47 41.1	7.0	2.6	0.19	19	1 43	11 32 49.85	1 14 51.6	9.1
4	23 28	6 20 29.34	23 54 37.1	6.9	2.6	0.19	20	1 42	11 36 31.09	0 40 7.1	9.2
5	23 33	6 29 48.45	23 58 58.0	6.8	2.6	0.19	21	1 42	11 40 3.21	+0 6 17.5	9.3
6	23 39	6 39 12.74	+24 0 37.5	6.8	2.6	0.19	22	1 41	11 43 25.85	−0 26 32.5	9.5
7	23 44	6 48 40.46	23 59 31.2	6.7	2.5	0.19	23	1 41	11 46 38.58	0 58 17.8	9.6
8	23 50	6 58 9.80	23 55 37.0	6.7	2.5	0.18	24	1 40	11 49 40.91	1 28 52.7	9.8
9	23 55	7 7 39.01	23 48 54.6	6.7	2.5	0.18	25	1 39	11 52 32.35	1 58 11.4	10.0
11	0 1	7 17 6.37	23 39 25.5	6.6	2.5	0.18	26	1 37	11 55 12.29	2 26 7.5	10.1
12	0 6	7 26 30.28	+23 27 13.2	6.6	2.5	0.18	27	1 36	11 57 40.07	−2 52 34.0	10.3
13	0 12	7 35 49.31	23 12 22.5	6.6	2.5	0.18	28	1 34	11 59 54.99	3 17 23.5	10.5
14	0 17	7 45 2.16	22 54 59.8	6.6	2.5	0.18	29	1 32	12 1 56.30	3 40 27.8	10.7
15	0 22	7 54 7.70	22 35 12.3	6.6	2.5	0.18	30	1 30	12 3 43.19	4 1 38.1	10.9
16	0 27	8 3 4.98	22 13 8.0	6.6	2.5	0.18	31	1 28	12 5 14.79	4 20 45.1	11.1
17	0 32	8 11 53.24	+21 48 55.8	6.6	2.5	0.18	Sept. 1	1 25	12 6 30.22	−4 37 38.7	11.3
18	0 37	8 20 31.87	21 22 44.2	6.6	2.5	0.18	2	1 22	12 7 28.54	4 52 8.2	11.5
19	0 41	8 29 0.41	20 54 42.4	6.6	2.5	0.18	3	1 19	12 8 8.80	5 4 2.1	11.7
20	0 45	8 37 18.55	20 24 59.2	6.7	2.5	0.18	4	1 15	12 8 30.11	5 13 8.5	11.9
21	0 50	8 45 26.09	19 53 43.4	6.7	2.5	0.18	5	1 11	12 8 31.59	5 19 15.0	12.1
22	0 54	8 53 22.91	+19 21 3.4	6.7	2.6	0.18	6	1 7	12 8 12.48	−5 22 9.2	12.3
23	0 57	9 1 8.99	18 47 7.5	6.8	2.6	0.18	7	1 3	12 7 32.12	5 21 39.2	12.6
24	1 1	9 8 44.41	18 12 3.4	6.8	2.6	0.18	8	0 58	12 6 30.05	5 17 33.0	12.8
25	1 5	9 16 9.24	17 35 58.4	6.9	2.6	0.18	9	0 52	12 5 6.13	5 9 40.8	12.9
26	1 8	9 23 23.64	16 58 59.6	6.9	2.6	0.18	10	0 47	12 3 20.51	4 57 54.4	13.1
27	1 11	9 30 27.82	+16 21 13.4	7.0	2.6	0.18	11	0 41	12 1 13.76	−4 42 8.6	13.3
28	1 14	9 37 21.93	15 42 45.8	7.0	2.7	0.18	12	0 34	11 58 47.00	4 22 22.2	13.4
29	1 17	9 44 6.22	15 3 43.0	7.1	2.7	0.19	13	0 27	11 56 1.89	3 58 39.0	13.6
30	1 19	9 50 40.92	14 24 10.1	7.1	2.7	0.19	14	0 21	11 53 0.76	3 31 9.2	13.6
31	1 22	9 57 6.22	13 44 12.4	7.2	2.7	0.19	15	0 13	11 49 46.56	3 0 9.1	13.7
Aug. 1	1 24	10 3 22.37	+13 3 54.6	7.3	2.8	0.19	16	0 6	11 46 22.91	−2 26 3.2	13.7
2	1 26	10 9 29.55	12 23 21.2	7.3	2.8	0.19	16	23 59	11 42 54.05	1 49 22.8	13.7
3	1 28	10 15 28.01	11 42 36.7	7.4	2.8	0.19	17	23 51	11 39 24.69	1 10 46.5	13.6
4	1 30	10 21 17.94	11 1 44.9	7.5	2.8	0.19	18	23 44	11 35 59.89	−0 30 59.0	13.5
5	1 32	10 26 59.49	10 20 49.8	7.6	2.9	0.19	19	23 37	11 32 44.95	+0 9 10.8	13.3
6	1 34	10 32 32.85	+ 9 39 55.2	7.7	2.9	0.20	20	23 30	11 29 45.03	+0 48 51.9	13.1
7	1 35	10 37 58.14	8 59 4.5	7.8	2.9	0.20	21	23 23	11 27 5.11	1 27 12.6	12.9
8	1 36	10 43 15.49	8 18 21.3	7.8	3.0	0.20	22	23 17	11 24 49.71	2 3 24.4	12.6
9	1 38	10 48 25.01	7 37 49.0	7.9	3.0	0.20	23	23 11	11 23 2.73	2 36 41.9	12.3
10	1 39	10 53 26.75	6 57 31.2	8.0	3.0	0.20	24	23 6	11 21 47.31	3 6 26.3	12.0
11	1 40	10 58 20.76	+ 6 17 30.9	8.1	3.1	0.21	25	23 2	11 21 5.83	+3 32 4.8	11.7
12	1 40	11 3 7.05	5 37 51.6	8.2	3.1	0.21	26	22 58	11 20 59.76	3 53 12.4	11.3
13	1 41	11 7 45.62	4 58 36.6	8.3	3.2	0.21	27	22 54	11 21 29.76	4 9 31.1	11.0
14	1 42	11 12 16.41	4 19 49.1	8.5	3.2	0.21	28	22 51	11 22 35.73	4 20 50.5	10.
15	1 42	11 16 39.36	3 41 32.8	8.6	3.2	0.22	29	22 49	11 24 16.85	4 27 6.2	10.
16	*1 43*	*11 20 54.35*	+ 3 3 51.3	8.7	3.3	0.22	30	22 47	11 26 31.71	+4 28 20.4	10
17	*1 43*	*11 25 1.23*	+ 2 26 47.9	8.8	3.3	0.22	Oct. 1	22 46	11 29 18.41	+4 24 40.0	

FOR TRANSIT AT WASHINGTON.

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FOR TRANSIT AT WASHINGTON.

FOR TRANSIT AT WASHINGTON.

FOR TRANSIT AT WASHINGTON.

FOR TRANSIT AT WASHINGTON.

Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S. T. of Sem. Pass. Mer.	Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S. T. of Sem. Pass. Mer.
h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
15 1 0.34	−18 26 22.5	8.0	7.7	0.54	Nov. 15	3 5	18 42 22.93	−26 8 46.8	11.3	11.0	0.81
15 5 42.58	18 49 20.8	8.0	7.8	0.55	16	3 6	18 47 12.08	26 3 58.2	11.4	11.1	0.82
15 10 25.80	19 11 52.3	8.1	7.8	0.55	17	3 7	18 51 59.73	25 58 30.7	11.5	11.2	0.83
15 15 10.02	19 33 56.7	8.1	7.9	0.56	18	3 8	18 56 45.81	25 52 24.7	11.6	11.3	0.83
15 19 55.23	19 55 32.9	8.2	8.0	0.56	19	3 8	19 1 30.23	25 45 40.8	11.7	11.4	0.84
15 24 41.43	−20 16 40.5	8.2	8.0	0.57	20	3 9	19 6 12.88	−25 38 19.3	11.9	11.6	0.85
15 29 28.62	20 37 18.7	8.3	8.0	0.57	21	3 10	19 10 53.69	25 30 20.8	12.0	11.7	0.86
15 34 16.79	20 57 26.8	8.3	8.1	0.58	22	3 11	19 15 32.56	25 21 46.0	12.1	11.8	0.87
15 39 5.93	21 17 4.2	8.4	8.2	0.58	23	3 11	19 20 9.38	25 12 35.4	12.2	11.9	0.88
15 43 56.03	21 36 10.5	8.4	8.2	0.59	24	3 12	19 24 44.09	25 2 49.6	12.4	12.0	0.88
15 48 47.07	−21 54 44.6	8.5	8.3	0.59	25	3 12	19 29 16.61	−24 52 29.4	12.5	12.1	0.89
15 53 39.03	22 12 46.0	8.6	8.3	0.60	26	3 13	19 33 46.83	24 41 35.2	12.6	12.3	0.90
15 58 31.87	22 30 14.3	8.6	8.4	0.60	27	3 14	19 38 14.69	24 30 7.8	12.8	12.4	0.91
16 3 25.60	22 47 8.6	8.7	8.5	0.61	28	3 14	19 42 40.09	24 18 8.1	12.9	12.5	0.92
16 8 20.15	23 3 28.4	8.7	8.5	0.62	29	3 14	19 47 2.98	24 5 36.6	13.1	12.7	0.93
16 13 15.51	−23 19 13.3	8.8	8.5	0.62	30	3 15	19 51 23.28	−23 52 34.2	13.2	12.8	0.94
16 18 11.65	23 34 22.4	8.9	8.6	0.63	Dec. 1	3 15	19 55 40.89	23 39 1.7	13.4	13.0	0.94
16 23 8.50	23 48 55.4	8.9	8.7	0.63	2	3 15	19 59 55.78	23 24 59.7	13.5	13.1	0.95
16 28 6.02	24 2 51.7	9.0	8.7	0.64	3	3 16	20 4 7.84	23 10 29.2	13.7	13.3	0.96
16 33 4.16	24 16 10.8	9.1	8.8	0.64	4	3 16	20 8 17.03	22 55 30.8	13.8	13.4	0.97
16 38 2.88	−24 28 52.4	9.1	8.9	0.65	5	3 16	20 12 23.24	−22 40 5.7	14.0	13.6	0.98
16 43 2.12	24 40 55.8	9.2	8.9	0.65	6	3 16	20 16 26.42	22 24 14.6	14.2	13.8	0.99
16 48 1.81	24 52 20.6	9.3	9.0	0.66	7	3 16	20 20 26.47	22 7 58.4	14.3	13.9	1.00
16 53 1.90	25 3 6.6	9.3	9.1	0.67	8	3 16	20 24 23.36	21 51 17.8	14.5	14.1	1.01
16 58 2.33	25 13 13.3	9.4	9.1	0.68	9	3 16	20 28 16.97	21 34 14.2	14.7	14.3	1.02
17 3 3.02	−25 22 40.3	9.5	9.2	0.68	10	3 16	20 32 7.25	−21 16 48.1	14.9	14.5	1.03
17 8 3.93	25 31 27.5	9.6	9.3	0.69	11	3 16	20 35 54.08	20 59 0.8	15.1	14.6	1.04
17 13 4.97	25 39 34.3	9.6	9.4	0.69	12	3 16	20 39 37.42	20 40 53.1	15.2	14.8	1.05
17 18 6.08	25 47 0.8	9.7	9.4	0.70	13	3 16	20 43 17.15	20 22 26.1	15.4	15.0	1.06
17 23 7.18	25 53 46.5	9.8	9.5	0.71	14	3 15	20 46 53.20	20 3 41.1	15.6	15.2	1.07
17 28 8.22	−25 59 51.5	9.9	9.6	0.71	15	3 15	20 50 25.47	−19 44 38.8	15.9	15.4	1.08
17 33 9.12	26 5 15.3	10.0	9.7	0.72	16	3 14	20 53 53.86	19 25 20.6	16.1	15.6	1.10
17 38 9.80	26 9 57.9	10.1	9.8	0.73	17	3 14	20 57 18.25	19 5 47.4	16.3	15.8	1.11
17 43 10.19	26 13 59.3	10.1	9.8	0.74	18	3 13	21 0 38.56	18 46 0.7	16.5	16.0	1.13
17 48 10.20	26 17 19.3	10.2	9.9	0.74	19	3 12	21 3 54.65	18 26 1.4	16.7	16.2	1.14
17 53 9.78	−26 19 58.0	10.3	10.0	0.75	20	3 12	21 7 6.42	−18 5 50.9	17.0	16.5	1.16
17 58 8.83	26 21 55.2	10.4	10.1	0.76	21	3 11	21 10 13.75	17 45 30.3	17.2	16.7	1.17
18 3 7.29	26 23 11.2	10.5	10.2	0.76	22	3 10	21 13 16.53	17 25 1.0	17.5	17.0	1.19
18 8 5.05	26 23 45.7	10.6	10.3	0.77	23	3 9	21 16 14.61	17 4 24.0	17.7	17.2	1.20
18 13 2.04	26 23 39.3	10.7	10.4	0.77	24	3 8	21 19 7.87	16 43 40.8	18.0	17.5	1.22
18 17 58.17	−26 22 51.8	10.8	10.5	0.78	25	3 7	21 21 56.19	−16 22 52.6	18.2	17.7	1.23
18 22 53.36	26 21 23.5	10.9	10.6	0.79	26	3 6	21 24 39.43	16 2 0.8	18.5	18.0	1.25
18 27 47.52	26 19 14.5	11.0	10.7	0.79	27	3 4	21 27 17.44	15 41 6.6	18.8	18.3	1.27
18 32 40.56	26 16 25.1	11.1	10.8	0.80	28	3 3	21 29 50.09	15 20 11.4	19.1	18.5	1.28
18 37 32.40	26 12 55.8	11.2	10.9	0.80	29	3 1	21 32 17.23	14 59 16.4	19.4	18.8	1.30
18 42 22.93	*−26 8 46.8*	*11.3*	*11.0*	*0.81*	30	3 0	21 34 38.73	−14 38 23.3	19.7	19.1	1.31
18 47 12.08	*−26 3 58.2*	*11.4*	*11.1*	*0.82*	31	2 58	21 36 54.40	−14 17 33.4	20.0	19.4	1.33

FOR TRANSIT AT WASHINGTON.

Stellar magnitude at opposition in March, 1918, —1.1.

FOR TRANSIT AT WASHINGTON.

Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Polar Semidiam.	S. T. of Sem. Pass. Mer.	Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Polar Semidiam.	S. T. of Sem. Pass. Mer.
h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
1 37 2.41	+ 8 45 51.2	1.9	20.3	1.46	Aug. 17	18 43	4 28 6.59	+20 54 14.9	1.7	18.2	1.39
1 37 11.70	8 47 4.7	1.9	20.3	1.46	18	18 40	4 28 38.52	20 55 21.4	1.7	18.3	1.39
1 37 21.75	8 48 22.5	1.9	20.2	1.45	19	18 36	4 29 9.84	20 56 26.0	1.7	18.3	1.39
1 37 32.55	8 49 44.4	1.9	20.1	1.45	20	18 33	4 29 40.56	20 57 28.9	1.7	18.4	1.40
1 37 44.08	8 51 10.6	1.9	20.1	1.44	21	18 29	4 30 10.67	20 58 30.0	1.7	18.4	1.40
1 37 56.35	+ 8 52 41.1	1.9	20.0	1.44	22	18 26	4 30 40.14	+20 59 29.5	1.7	18.5	1.41
1 38 9.35	8 54 15.6	1.9	19.9	1.43	23	18 22	4 31 8.99	21 0 27.2	1.7	18.5	1.41
1 38 23.08	8 55 54.0	1.9	19.9	1.43	24	18 19	4 31 37.20	21 1 23.1	1.7	18.6	1.41
1 38 37.53	8 57 36.6	1.8	19.8	1.42	25	18 15	4 32 4.76	21 2 17.4	1.7	18.6	1.42
1 38 52.71	8 59 23.1	1.8	19.7	1.42	26	18 12	4 32 31.68	21 3 10.0	1.8	18.7	1.42
1 39 8.59	+ 9 1 13.6	1.8	19.7	1.41	27	18 9	4 32 57.93	+21 4 0.8	1.8	18.8	1.43
1 39 25.18	9 3 7.9	1.8	19.6	1.41	28	18 5	4 33 23.52	21 4 50.1	1.8	18.8	1.43
1 39 42.47	9 5 6.1	1.8	19.5	1.40	29	18 2	4 33 48.43	21 5 37.5	1.8	18.9	1.44
1 40 0.46	9 7 8.1	1.8	19.5	1.40	30	17 58	4 34 12.66	21 6 23.4	1.8	18.9	1.44
1 40 19.12	9 9 13.9	1.8	19.4	1.40	31	17 54	4 34 36.21	21 7 7.5	1.8	19.0	1.45
1 40 38.49	+ 9 11 23.4	1.8	19.3	1.39	Sept. 1	17 51	4 34 59.05	+21 7 49.9	1.8	19.1	1.45
1 40 58.53	9 13 36.5	1.8	19.3	1.39	2	17 47	4 35 21.20	21 8 30.7	1.8	19.1	1.45
1 41 19.25	9 15 53.4	1.8	19.2	1.38	3	17 44	4 35 42.65	21 9 9.9	1.8	19.2	1.46
1 41 40.63	9 18 13.9	1.8	19.2	1.38	4	17 40	4 36 3.37	21 9 47.4	1.8	19.2	1.46
1 42 2.68	9 20 37.8	1.8	19.1	1.37	5	17 36	4 36 23.38	21 10 23.3	1.8	19.3	1.47
1 42 25.38	+ 9 23 5.3	1.8	19.0	1.37	6	17 33	4 36 42.64	+21 10 57.5	1.8	19.4	1.47
1 42 48.73	9 25 36.3	1.8	19.0	1.36	7	17 29	4 37 1.16	21 11 30.1	1.8	19.4	1.48
1 43 12.74	9 28 10.6	1.8	18.9	1.36	8	17 26	4 37 18.93	21 12 1.1	1.8	19.5	1.48
1 43 37.38	9 30 48.3	1.8	18.8	1.35	9	17 22	4 37 35.95	21 12 30.3	1.8	19.5	1.49
1 44 2.66	9 33 29.3	1.8	18.8	1.35	10	17 18	4 37 52.19	21 12 58.1	1.8	19.6	1.49
1 44 28.57	+ 9 36 13.5	1.8	18.7	1.35	11	17 15	4 38 7.67	+21 13 24.1	1.8	19.7	1.49
1 44 55.09	9 39 1.0	1.7	18.7	1.35	12	17 11	4 38 22.36	21 13 48.6	1.8	19.7	1.50
1 45 22.22	9 41 51.4	1.7	18.6	1.34	13	17 7	4 38 36.26	21 14 11.5	1.8	19.8	1.50
1 45 49.94	9 44 44.9	1.7	18.5	1.34	14	17 4	4 38 49.37	21 14 32.6	1.9	19.8	1.51
1 46 18.26	9 47 41.5	1.7	18.5	1.33	15	17 0	4 39 1.68	21 14 52.3	1.9	19.9	1.51
1 46 47.16	+ 9 50 41.0	1.7	18.4	1.33	16	16 56	4 39 13.18	+21 15 10.3	1.9	20.0	1.52
1 47 16.65	9 53 43.4	1.7	18.4	1.33	17	16 52	4 39 23.88	21 15 26.8	1.9	20.0	1.52
1 47 46.69	9 56 48.5	1.7	18.3	1.32	18	16 49	4 39 33.77	21 15 41.5	1.9	20.1	1.53
1 48 17.31	9 59 56.4	1.7	18.3	1.32	19	16 45	4 39 42.83	21 15 54.8	1.9	20.2	1.53
1 48 48.49	10 3 7.1	1.7	18.2	1.32	20	16 41	4 39 51.07	21 16 6.5	1.9	20.2	1.54
1 49 20.21	+10 6 20.4	1.7	18.2	1.31	21	16 37	4 39 58.49	+21 16 16.6	1.9	20.3	1.54
1 49 52.48	10 9 36.3	1.7	18.1	1.31	22	16 33	4 40 5.08	21 16 25.1	1.9	20.4	1.55
1 50 25.27	10 12 54.8	1.7	18.1	1.30	23	16 30	4 40 10.83	21 16 32.1	1.9	20.4	1.55
1 50 58.59	10 16 15.7	1.7	18.0	1.30	24	16 26	4 40 15.75	21 16 37.4	1.9	20.5	1.56
1 51 32.45	10 19 39.1	1.7	17.9	1.29	25	16 22	4 40 19.82	21 16 41.2	1.9	20.5	1.56
1 52 6.82	+10 23 4.9	1.7	17.9	1.29	26	16 18	4 40 23.06	+21 16 43.5	1.9	20.6	1.57
1 52 41.70	10 26 33.0	1.7	17.8	1.29	27	16 14	4 40 25.45	21 16 44.2	1.9	20.7	1.57
1 53 17.07	10 30 3.5	1.7	17.8	1.29	28	16 10	4 40 27.00	21 16 43.3	1.9	20.7	1.58
1 53 52.95	10 33 36.2	1.7	17.8	1.29	29	16 6	4 40 27.71	21 16 40.8	1.9	20.8	1.59
1 54 29.31	10 37 11.2	1.7	17.7	1.28	30	16 2	4 40 27.58	21 16 36.8	2.0	20.9	1.60
4 27 34.07	*+20 53 6.8*	*1.7*	*18.2*	1.38	Oct. 1	15 58	4 40 26.58	+21 16 31.3	2.0	20.9	1.60
4 28 6.59	*+20 54 14.9*	*1.7*	*18.2*	1.39	2	15 54	4 40 24.75	+21 16 24.2	2.0	21.0	1.6

Stellar magnitude at opposition in November, 1917, −2.4.

FOR TRANSIT AT WASHINGTON.

Stellar magnitude at opposition in November, 1917, −2.4.

[illegible]	Polar Semidiam.	S. T. of Sem. Pass. Mer.
"	"	s
.1	9.4	0.74
.1	9.4	0.74
.1	9.4	0.74
.1	9.4	0.74
.1	9.4	0.74
.1	9.4	0.74
.1	9.4	0.74
.1	9.4	0.73
.1	9.3	0.73
.1	9.3	0.73
.1	9.3	0.73
.1	9.3	0.73
.1	9.3	0.73
.1	9.3	0.73
.1	9.3	0.73
.1	9.2	0.73
.1	9.2	0.73
.0	9.2	0.73
.0	9.2	0.72
.0	9.2	0.72
.0	9.2	0.72
.0	9.2	0.72
.0	9.2	0.72
.0	9.1	0.72
.0	9.1	0.72
.0	9.1	0.72
.0	9.1	0.71
.0	9.1	0.71
.0	9.1	0.71
.0	9.0	0.71
.0	9.0	0.71
.0	9.0	0.71
.0	9.0	0.71
.0	9.0	0.71
.0	9.0	0.71
.0	9.0	0.70
.0	8.9	0.70
.0	8.9	0.70
.0	8.9	0.70
.0	8.9	0.70
.0	8.9	0.70
.0	8.9	0.70
.0	8.8	0.69
.0	8.8	0.69
.0	8.8	0.69
1.0	8.8	0.69
1.0	8.8	0.69

Stellar magnitude at opposition in January, 1917, −0.1.

FOR TRANSIT AT WASHINGTON.

Stellar magnitude at opposition in January, 1917, −0.1.

FOR TRANSIT AT WASHINGTON.

parent nation.	Semidiam.	S. T. of Sem. Pass. Mer.	Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S. T. of Sem. Pass. Mer.
′ ″	″	s		h m	h m s	° ′ ″	″	″	s
19 8.0	1.7	0.12	July 22	13 39	21 40 54.36	−14 41 26.5	0.5	1.8	0.12
19 20.0	1.7	0.12	23	13 35	21 40 46 00	14 42 9.6	0.5	1.8	0.12
19 32.3	1.7	0.12	24	13 31	21 40 37.57	14 42 53.0	0.5	1.8	0.12
19 45.5	1.7	0.12	25	13 27	21 40 29.04	14 43 36.8	0.5	1.8	0 12
19 59.6	1.7	0.12	26	13 23	21 40 20.45	14 44 21.0	0.5	1.8	0.12
20 14.6	1.7	0.12	27	13 19	21 40 11.78	−14 45 5.3	0.5	1 8	0.12
20 30.5	1.7	0.12	28	13 15	21 40 3.04	14 45 50 0	0.5	1.8	0.12
20 47.3	1.7	0.12	29	13 10	21 39 54.24	14 46 34.9	0.5	1.8	0.12
2	1.7	0.12	30	13 6	21 39 45.39	14 47 20.2	0 5	1.8	0.12
2	1.7	0.12	31	13 2	21 39 36.48	14 48 5.5	0.5	1.8	0.12
2	1.7	0.12	Aug. 1	12 58	21 39 27.51	−14 48 51.1	0.5	1.8	0.12
2	1.7	0.12	2	12 54	21 39 18.48	14 49 36 8	0.5	1 8	0.12
2	1.7	0.12	3	12 50	21 39 9.42	14 50 22 6	0.5	1.8	0 12
2	1.7	0.12	4	12 46	21 39 0.31	14 51 8.8	0.5	1.8	0.12
2	1.7	0.12	5	12 42	21 38 51.16	14 51 55.0	0.5	1.8	0.12
2	1.7	0.12	6	12 38	21 38 41.97	−14 52 41 3	0.5	1.8	0.12
2	1.7	0.12	7	12 34	21 38 32.75	14 53 27.7	0.5	1.8	0.12
2	1.7	0.12	8	12 30	21 38 23.50	14 54 14.3	0.5	1.8	0 12
2	1.7	0.12	9	12 26	21 38 14.22	14 55 0.8	0.5	1.8	0.12
2	1.7	0.12	10	12 22	21 38 4.93	14 55 47.4	0.5	1.8	0.12
2	1.7	0.12	11	12 18	21 37 55.61	−14 56 34.0	0.5	1.8	0.12
2	1.7	0.12	12	12 13	21 37 46.28	14 57 20.6	0.5	1.8	0 12
2	1.7	0.12	13	12 9	21 37 36.95	14 58 7.1	0.5	1.8	0.12
2	1.7	0.12	14	12 5	21 37 27 60	14 58 53.7	0.5	1.8	0.12
2	1.7	0.12	15	12 1	21 37 18.25	14 59 40.1	0.5	1 8	0.12
2	1.7	0.12	16	11 57	21 37 8.89	−15 0 26.5	0.5	1 8	0.12
2	1.7	0.12	17	11 53	21 36 59.55	15 1 12.8	0.5	1.8	0.12
2	1.7	0.12	18	11 49	21 36 50.21	15 1 59.0	0.5	1.8	0.12
2	1.7	0 12	19	11 45	21 36 40 90	15 2 45.0	0.5	1.8	0.12
3	1.7	0 12	20	11 41	21 36 31.59	15 3 30.9	0.5	1.8	0 12
3	1.7	0.12	21	11 37	21 30 22.31	−15 4 16.7	0.5	1.8	0.12
3	1.7	0.12	22	11 32	21 36 13.05	15 5 2.1	0.5	1.8	0 12
3	1.7	0.12	23	11 28	21 36 3.83	15 5 47.4	0 5	1.8	0 12
3	1.8	0.12	24	11 24	21 35 54.64	15 6 32.4	0.5	1.8	0.12
3	1.8	0.12	25	11 20	21 35 45.47	15 7 17.2	0.5	1.8	0.12
3	1.8	0.12	26	11 16	21 35 36.36	−15 8 1.7	0.5	1.8	0.12
3	1.8	0.12	27	11 12	21 35 27.29	15 8 45 9	0 5	1.8	0.12
3	1.8	0.12	28	11 8	21 35 18.27	15 9 29 9	0.5	1.8	0 12
3	1.8	0.12	29	11 4	21 35 9.31	15 10 13.4	0.5	1 8	0 12
3	1.8	0.12	30	11 0	21 35 0.40	15 10 56.6	0.5	1.8	0.12
3	1.8	0.12	31	10 56	21 34 51.54	−15 11 39.6	0.5	1.8	0.12
3	1.8	0 12	Sept. 1	10 52	21 34 42.75	15 12 22 1	0 5	1 8	0 12
3	1.8	0 12	2	10 48	21 34 34.03	15 13 4 2	0.5	1.8	0 12
3	1.8	0.12	3	10 44	21 34 25.37	15 13 45 8	0.5	1.8	0.12
4	1.8	0.12	4	10 40	21 34 16.79	15 14 27.1	0.5	1.8	0.12
	1.8	0.12	5	10 35	21 34 8.29	−15 15 8.0	0.5	1 8	0.12
	1.8	0.12	6	10 31	21 33 59.86	−15 15 48.4	0.5	1.8	0.12

Stellar magnitude at opposition, in August, 1917, 6.0.

FOR TRANSIT AT WASHINGTON.

Stellar magnitude at opposition, in August, 1917, 6.0

FOR TRANSIT AT WASHINGTON.

Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S. T. of Sem. Pass. Mer.	Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S. T. of Sem. Pass. Mer.
h m s	° ′ ″	″	″	s		h m	h m s	° ′ ″	″	″	s
8 25 33.79	+19 0 9.6	0.3	1.3	0.09	Feb. 15	10 38	8 20 25.84	+19 18 5.2	0.3	1.3	0.09
8 25 27.56	19 0 31.5	0.3	1.3	0.09	16	10 34	8 20 19.64	19 18 26.8	0.3	1.3	0.09
8 25 21.27	19 0 53.7	0.3	1.3	0.09	17	10 30	8 20 13.51	19 18 48.1	0.3	1.3	0.09
8 25 14.94	19 1 16.0	0.3	1.3	0.09	18	10 26	8 20 7.46	19 19 9.2	0.3	1.3	0.09
8 25 8.54	19 1 38.5	0.3	1.3	0.09	19	10 22	8 20 1.46	19 19 30.0	0.3	1.3	0.09
8 25 2.09	+19 2 1.3	0.3	1.3	0.09	20	10 18	8 19 55.54	+19 19 50.6	0.3	1.3	0.09
8 24 55.59	19 2 24.1	0.3	1.3	0.09	21	10 14	8 19 49.70	19 20 10.9	0.3	1.3	0.09
8 24 49.04	19 2 47.1	0.3	1.3	0.09	22	10 10	8 19 43.92	19 20 31.1	0.3	1.3	0.09
8 24 42.44	19 3 10.3	0.3	1.3	0.09	23	10 6	8 19 38.23	19 20 50.8	0.3	1.3	0.09
8 24 35.81	19 3 33.6	0.3	1.3	0.09	24	10 2	8 19 32.63	19 21 10.4	0.3	1.3	0.09
8 24 29.14	+19 3 57.0	0.3	1.3	0.09	25	9 58	8 19 27.10	+19 21 29.6	0.3	1.3	0.09
8 24 22.42	19 4 20.5	0.3	1.3	0.09	26	9 54	8 19 21.66	19 21 48.6	0.3	1.3	0.09
8 24 15.67	19 4 44.2	0.3	1.3	0.09	27	9 50	8 19 16.31	19 22 7.3	0.3	1.3	0.09
8 24 8.90	19 5 7.9	0.3	1.3	0.09	28	9 46	8 19 11.05	19 22 25.6	0.3	1.3	0.09
8 24 2.09	19 5 31.7	0.3	1.3	0.09	Mar. 1	9 42	8 19 5.88	19 22 43.6	0.3	1.3	0.09
8 23 55.26	+19 5 55.7	0.3	1.3	0.09	2	9 38	8 19 0.80	+19 23 1.4	0.3	1.3	0.09
8 23 48.39	19 6 19.7	0.3	1.3	0.09	3	9 34	8 18 55.82	19 23 18.8	0.3	1.3	0.09
8 23 41.51	19 6 43.9	0.3	1.3	0.09	4	9 30	8 18 50.93	19 23 35.9	0.3	1.3	0.09
8 23 34.60	19 7 8.0	0.3	1.3	0.09	5	9 26	8 18 46.15	19 23 52.7	0.3	1.3	0.09
8 23 27.69	19 7 32.1	0.3	1.3	0.09	6	9 22	8 18 41.47	19 24 9.1	0.3	1.3	0.09
8 23 20.77	+19 7 56.3	0.3	1.3	0.09	7	9 18	8 18 36.89	+19 24 25.2	0.3	1.3	0.09
8 23 13.84	19 8 20.6	0.3	1.3	0.09	8	9 14	8 18 32.41	19 24 40.9	0.3	1.3	0.09
8 23 6.90	19 8 44.8	0.3	1.3	0.09	9	9 10	8 18 28.05	19 24 56.4	0.3	1.3	0.09
8 22 59.95	19 9 9.0	0.3	1.3	0.09	10	9 6	8 18 23.79	19 25 11.4	0.3	1.3	0.09
8 22 53.01	19 9 33.3	0.3	1.3	0.09	11	9 2	8 18 19.63	19 25 26.0	0.3	1.3	0.09
8 22 46.07	+19 9 57.5	0.3	1.3	0.09	12	8 58	8 18 15.60	+19 25 40.3	0.3	1.3	0.09
8 22 39.13	19 10 21.7	0.3	1.3	0.09	13	8 54	8 18 11.67	19 25 54.3	0.3	1.3	0.09
8 22 32.19	19 10 45.9	0.3	1.3	0.09	14	8 50	8 18 7.85	19 26 7.9	0.3	1.3	0.09
8 22 25.27	19 11 10.0	0.3	1.3	0.09	15	8 46	8 18 4.15	19 26 21.1	0.3	1.3	0.09
8 22 18.37	19 11 34.1	0.3	1.3	0.09	16	8 42	8 18 0.56	19 26 33.9	0.3	1.3	0.09
8 22 11.49	+19 11 58.0	0.3	1.3	0.09	17	8 38	8 17 57.10	+19 26 46.3	0.3	1.3	0.09
8 22 4.62	19 12 21.9	0.3	1.3	0.09	18	8 34	8 17 53.76	19 26 58.4	0.3	1.3	0.09
8 21 57.78	19 12 45.7	0.3	1.3	0.09	19	8 30	8 17 50.53	19 27 10.0	0.3	1.3	0.09
8 21 50.96	19 13 9.4	0.3	1.3	0.09	20	8 26	8 17 47.41	19 27 21.2	0.3	1.3	0.09
8 21 44.18	19 13 32.9	0.3	1.3	0.09	21	8 22	8 17 44.43	19 27 32.0	0.3	1.3	0.09
8 21 37.42	+19 13 56.5	0.3	1.3	0.09	22	8 18	8 17 41.58	+19 27 42.4	0.3	1.3	0.09
8 21 30.69	19 14 19.9	0.3	1.3	0.09	23	8 14	8 17 38.85	19 27 52.4	0.3	1.3	0.09
8 21 24.01	19 14 43.1	0.3	1.3	0.09	24	8 10	8 17 36.24	19 28 2.0	0.3	1.2	0.09
8 21 17.36	19 15 6.2	0.3	1.3	0.09	25	8 6	8 17 33.77	19 28 11.1	0.3	1.2	0.09
8 21 10.75	19 15 29.2	0.3	1.3	0.09	26	8 2	8 17 31.43	19 28 19.8	0.3	1.2	0.09
8 21 4.18	+19 15 52.1	0.3	1.3	0.09	27	7 58	8 17 29.22	+19 28 28.1	0.3	1.2	0.09
8 20 57.65	19 16 14.7	0.3	1.3	0.09	28	7 54	8 17 27.13	19 28 36.1	0.3	1.2	0.09
8 20 51.18	19 16 37.2	0.3	1.3	0.09	29	7 50	8 17 25.18	19 28 43.6	0.3	1.2	0.09
8 20 44.76	19 16 59.5	0.3	1.3	0.09	30	7 46	8 17 23.36	19 28 50.6	0.3	1.2	0.09
8 20 38.40	19 17 21.6	0.3	1.3	0.09	31	7 42	8 17 21.68	19 28 57.2	0.3	1.2	0.09
8 20 32.10	+19 17 43.6	0.3	1.3	0.09	Apr. 1	7 38	8 17 20.12	+19 29 3.4	0.3	1.2	0.09
8 20 25.84	+19 18 5.2	0.3	1.3	0.09	2	7 34	8 17 18.70	+19 29 9.1	0.3	1.2	0.09

Stellar magnitude at opposition in January, 1917, 7.7.

FOR TRANSIT AT WASHINGTON.

Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S. T. of Sem. Pass. Mer.
	h m	h m s	° ′ ″	″	″	s
Apr. 1	7 38	8 17 20.12	+19 29 3.4	0.3	1.2	0.09
2	7 34	8 17 18.70	19 29 9.1	0.3	1.2	0.09
3	7 30	8 17 17.41	19 29 14.4	0.3	1.2	0.09
4	7 26	8 17 16.25	19 29 19.3	0.3	1.2	0.09
5	7 22	8 17 15.23	19 29 23.7	0.3	1.2	0.09
6	7 18	8 17 14.35	+19 29 27.6	0.3	1.2	0.09
7	7 14	8 17 13.61	19 29 31.2	0.3	1.2	0.09
8	7 10	8 17 13.00	19 29 34.3	0.3	1.2	0.09
9	7 7	8 17 12.52	19 29 37.0	0.3	1.2	0.09
10	7 3	8 17 12.18	19 29 39.2	0.3	1.2	0.09
11	6 59	8 17 11.98	+19 29 41.1	0.3	1.2	0.09
12	6 55	8 17 11.92	19 29 42.5	0.3	1.2	0.09
13	6 51	8 17 11.99	19 29 43.3	0.3	1.2	0.09
14	6 47	8 17 12.20	19 29 43.7	0.3	1.2	0.09
15	6 43	8 17 12.54	19 29 43.7	0.3	1.2	0.09
16	6 39	8 17 13.03	+19 29 43.2	0.3	1.2	0.09
17	6 35	8 17 13.64	19 29 42.3	0.3	1.2	0.09
18	6 31	8 17 14.40	19 29 40.9	0.3	1.2	0.09
19	6 27	8 17 15.30	19 29 39.1	0.3	1.2	0.09
20	6 23	8 17 16.33	19 29 36.8	0.3	1.2	0.09
Oct. 20	18 40	8 37 25.29	+18 21 32.8	0.3	1.2	0.09
21	18 36	8 37 27.91	18 21 23.5	0.3	1.2	0.09
22	18 32	8 37 30.39	18 21 14.5	0.3	1.2	0.09
23	18 28	8 37 32.74	18 21 6.1	0.3	1.2	0.09
24	18 24	8 37 34.95	18 20 58.1	0.3	1.2	0.09
25	18 20	8 37 37.03	+18 20 50.6	0.3	1.2	0.09
26	18 17	8 37 38.98	18 20 43.7	0.3	1.2	0.09
27	18 13	8 37 40.79	18 20 37.3	0.3	1.2	0.09
28	18 9	8 37 42.46	18 20 31.4	0.3	1.2	0.09
29	18 5	8 37 43.99	18 20 26.0	0.3	1.2	0.09
30	18 1	8 37 45.39	+18 20 21.1	0.3	1.2	0.09
31	17 57	8 37 46.65	18 20 16.7	0.3	1.2	0.09
Nov. 1	17 53	8 37 47.77	18 20 12.8	0.3	1.2	0.09
2	17 49	8 37 48.75	18 20 9.4	0.3	1.2	0.09
3	17 45	8 37 49.59	18 20 6.6	0.3	1.2	0.09
4	17 41	8 37 50.30	+18 20 4.2	0.3	1.2	0.09
5	17 37	8 37 50.87	18 20 2.4	0.3	1.2	0.09
6	17 33	8 37 51.30	18 20 1.1	0.3	1.2	0.09
7	17 30	8 37 51.59	18 20 0.3	0.3	1.2	0.09
8	17 26	8 37 51.74	18 20 0.0	0.3	1.2	0.09
9	17 22	8 37 51.75	+18 20 0.3	0.3	1.2	0.09
10	17 18	8 37 51.62	18 20 1.0	0.3	1.2	0.09
11	17 14	8 37 51.36	18 20 2.3	0.3	1.2	0.09
12	17 10	8 37 50.95	18 20 4.1	0.3	1.2	0.09
13	17 6	8 37 50.41	18 20 6.5	0.3	1.2	0.09
14	*17 2*	*8 37 49.73*	+18 20 9.3	0.3	1.2	0.09
15	*16 58*	*8 37 48.91*	+18 20 12.7	0.3	1.2	0.09

Date.	Wash. Mean Time.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.
	h m	h m s	° ′ ″	″
Nov. 15	16 58	8 37 48.91	+18 20 12.7	0.3
16	16 54	8 37 47.95	18 20 16.6	0.3
17	16 50	8 37 46.85	18 20 21.0	0.3
18	16 46	8 37 45.62	18 20 25.9	0.3
19	16 42	8 37 44.25	18 20 31.3	0.3
20	16 38	8 37 42.75	+18 20 37.2	0.3
21	16 34	8 37 41.11	18 20 43.6	0.3
22	16 30	8 37 39.34	18 20 50.6	0.3
23	16 27	8 37 37.44	18 20 58.0	0.3
24	16 23	8 37 35.41	18 21 5.9	0.3
25	16 19	8 37 33.24	+18 21 14.3	0.3
26	16 15	8 37 30.94	18 21 23.2	0.3
27	16 11	8 37 28.52	18 21 32.6	0.3
28	16 7	8 37 25.97	18 21 42.5	0.3
29	16 3	8 37 23.29	18 21 52.7	0.3
30	15 59	8 37 20.48	+18 22 3.5	0.3
Dec. 1	15 55	8 37 17.55	18 22 14.7	0.3
2	15 51	8 37 14.49	18 22 26.4	0.3
3	15 47	8 37 11.31	18 22 38.5	0.3
4	15 43	8 37 8.01	18 22 51.1	0.3
5	15 39	8 37 4.59	+18 23 4.2	0.3
6	15 35	8 37 1.05	18 23 17.7	0.3
7	15 31	8 36 57.39	18 23 31.6	0.3
8	15 27	8 36 53.61	18 23 46.0	0.3
9	15 23	8 36 49.72	18 24 0.8	0.3
10	15 19	8 36 45.72	+18 24 16.0	0.3
11	15 15	8 36 41.60	18 24 31.6	0.3
12	15 11	8 36 37.37	18 24 47.6	0.3
13	15 7	8 36 33.03	18 25 4.1	0.3
14	15 3	8 36 28.59	18 25 20.9	0.3
15	14 59	8 36 24.04	+18 25 38.2	0.3
16	14 55	8 36 19.38	18 25 55.8	0.3
17	14 51	8 36 14.63	18 26 13.8	0.3
18	14 47	8 36 9.77	18 26 32.2	0.3
19	14 43	8 36 4.82	18 26 50.8	0.3
20	14 39	8 35 59.77	+18 27 9.9	0.3
21	14 35	8 35 54.62	18 27 29.3	0.3
22	14 31	8 35 49.39	18 27 49.1	0.3
23	14 27	8 35 44.06	18 28 9.1	0.3
24	14 23	8 35 38.66	18 28 29.5	0.3
25	14 19	8 35 33.17	+18 28 50.1	0.3
26	14 15	8 35 27.60	18 29 11.1	0.3
27	14 11	8 35 21.95	18 29 32.3	0.3
28	14 7	8 35 16.22	18 29 53.8	0.3
29	14 2	8 35 10.41	18 30 15.6	0.3
30	13 58	8 35 4.54	+18 30 37.6	0.3
31	13 54	8 34 58.58	+18 31 0.0	0.3

Stellar magnitude at opposition in January, 1917, 7.7.

PART III.

PHENOMENA.

In the year 1917 there will be seven eclipses, four of the Sun and thre[e of] the Moon.

I.—*A Total Eclipse of the Moon*, 1917, January 7, visible at Washingt[on;] the beginning visible generally in central and western Europe, northwest[ern] Africa, North and South America, and the central and eastern portions of t[he] Pacific Ocean; the ending visible generally in North America, northwest[ern] South America, northern and northeastern Asia, and eastern Australia.

ELEMENTS OF THE ECLIPSE.

Greenwich mean time of ☍ in right ascension, January 7 d 19 h 37 m 51.9 s

	h m s		s
Sun's right ascension	19 15 47.52	Hourly motion	10.92
Moon's right ascension	7 15 47.52	Hourly motion	126.02
	° ′ ″		′ ″
Sun's declination	−22 18 27.7	Hourly motion	+ 0 19.7
Moon's declination	+22 31 53.8	Hourly motion	− 6 34.0
Sun's equa. hor. parallax	8.9	Sun's true semidiameter	16 15.9
Moon's equa. hor. parallax	54 9.8	Moon's true semidiameter	14 44.8

CIRCUMSTANCES OF THE ECLIPSE.

		d h m	
Moon enters penumbra	Jan.	7 16 35.7	Greenwich Mean Time.
Moon enters shadow		7 17 50.4	
Total eclipse begins		7 19 0.4	
Middle of the eclipse		7 19 44.6	
Total eclipse ends		7 20 28.8	
Moon leaves shadow		7 21 38.6	
Moon leaves penumbra		7 22 52.7	

Contacts of Shadow with Moon's Limb.	Angles of Position from the North Point.	The Moon Being in the Zenith in Longitude from Greenwich	and in Latitude
	°	° ′	° ′
First	117 to E.	+ 86 48	+22 43
Last	91 to W.	+142 0	+22 18

Magnitude of the eclipse=1.369 (Moon's diameter=1.0).

II.—*A Partial Eclipse of the Sun*, 1917, January 22, invisible at W[ash]ington.

ELEMENTS OF THE ECLIPSE.

Greenwich mean time of ☌ in right ascension, January 22 d 20 h 8 m 29.8 s

	h m s		s s
Sun and Moon's R. A	20 20 15.52	Hourly motions	10.51 and 152.97
	° ′ ″		′ ″
Sun's declination	19 32 52.6	Hourly motion	+ 0 34.9
Moon's declination	18 18 23.6	Hourly motion	+12 3.2
Sun's equa. hor. parallax	8.9	Sun's true semidiameter	16 14.8
Moon's equa. hor. parallax	61 26.7	Moon's true semidiameter	16 43.7

CIRCUMSTANCES OF THE ECLIPSE.

		Greenwich Mean Time.	Longitude from Greenwich.	Latitude.
		d h m	° ′	° ′
Eclipse begins	Jan.	22 17 43.4	−18 2.1	+28 1.6
Greatest eclipse		22 19 28.3	−25 42.7	+63 15.2
Eclipse ends		22 21 13.0	−95 56.2	+60 28.0

Magnitude of greatest eclipse=0.725 (Sun's diameter=1.0).

III.—*A Partial Eclipse of the Sun*, 1917, June 18–19, invisible at Wash-ton.

ELEMENTS OF THE ECLIPSE.

	d	h	m	s
Greenwich mean time of ☌ in right ascension, June	19	1	4	37.1

Sun and Moon's R. A.	5h 49m 44.49s	Hourly motions	10.40s and 137.78s
Sun's declination	+23° 25′ 46.2″	Hourly motion	+ 0′ 2.5″
Moon's declination	+24° 37′ 15.9″	Hourly motion	− 2′ 15.1″
Sun's equa. hor. parallax	8.7″	**Sun's true semidiameter**	15′ 44.3″
Moon's equa. hor. parallax	55′ 34.9″	**Moon's true semidiameter**	15′ 8.0″

CIRCUMSTANCES OF THE ECLIPSE.

	Greenwich Mean Time. d h m	Longitude from Greenwich. ° ′	Latitude. ° ′
Eclipse begins	June 18 23 36.0	+118 43.2	+52 54.9
Greatest eclipse	19 1 16.2	−150 6.0	+66 10.5
Eclipse ends	19 2 56.5	− 72 35.0	+45 48.3

Magnitude of greatest eclipse=0.473 (Sun's diameter=1.0).

IV.—*A Total Eclipse of the Moon*, 1917, July 4, invisible at Washington; beginning visible generally in Asia except the northeastern portion, Aus-lia, Africa, Europe except the northwestern portions, and the south Atlantic ean; the ending visible generally in western Australia, southwestern Asia, rope, Africa, and South America.

ELEMENTS OF THE ECLIPSE.

	d	h	m	s
Greenwich mean time of ☍ in right ascension, July	4	9	41	46.3

Sun's right ascension	6h 53m 27.05s	Hourly motion	10.30s
Moon's right ascension	18h 53m 27.05s	Hourly motion	157.11s
Sun's declination	+22° 52′ 53.9″	Hourly motion	− 0′ 13.1″
Moon's declination	−22° 44′ 11.1″	Hourly motion	+ 6′ 45.3″
Sun's equa. hor. parallax	8.7″	Sun's true semidiameter	15′ 43.9″
Moon's equa. hor. parallax	60′ 17.1″	Moon's true semidiameter	16′ 24.8″

CIRCUMSTANCES OF THE ECLIPSE.

		d	h	m	
Moon enters penumbra	July	4	6	55.8	Greenwich Mean Time.
Moon enters shadow		4	7	52.2	
Total eclipse begins		4	8	50.6	
Middle of the eclipse		4	9	38.9	
Total eclipse ends		4	10	27.2	
Moon leaves shadow		4	11	25.4	
Moon leaves penumbra		4	12	21.3	

Contacts of Shadow with Moon's Limb.	Angles of Position from the North Point. °	The Moon being in the Zenith in Longitude from Greenwich ° ′	and in Latitude ° ′
First	87 to E.	−61 52	−22 56
Last	109 to W.	−10 45	−22 32

Magnitude of the eclipse=1.625 (Moon's diameter=1.0).

V.—*A Partial Eclipse of the Sun,* 1917, July 18, invisible at Washington

ELEMENTS OF THE ECLIPSE.

Greenwich mean time of ☌ in right ascension, July 18d 15h 34m 16.6s

	h m s		s s
Sun and Moon's R. A.	7 51 28.79	Hourly motions	10.05 and 123.17
	° ′ ″		′ ″
Sun's declination	+20 58 48.8	Hourly motion	− 0 26.6
Moon's declination	+19 33 20.4	Hourly motion	− 8 12.7
Sun's equa. hor. parallax	8.7	Sun's true semidiameter	15 44.3
Moon's equa. hor. parallax	54 28.4	Moon's true semidiameter	14 49.9

CIRCUMSTANCES OF THE ECLIPSE.

		Greenwich Mean Time.	Longitude from Greenwich.	Latitude.
		d h m	° ′	° ′
Eclipse begins	July	18 13 56.5	− 93 30.7	−53 24.3
Greatest eclipse		18 14 42.5	−101 52.2	−63 43.5
Eclipse ends		18 15 28.3	−124 27.5	−68 56.6

Magnitude of greatest eclipse=0.086 (Sun's diameter=1.0).

VI.—*An Annular Eclipse of the Sun,* 1917, December 13, invisible at Washington.

ELEMENTS OF THE ECLIPSE.

Greenwich mean time of ☌ in right ascension, December 13d 21h 23m 24.0s

	h m s		s s
Sun and Moon's R. A.	17 24 27.34	Hourly motions	11.05 and 149.88
	° ′ ″		′ ″
Sun's declination	−23 11 54.5	Hourly motion	− 0 9.4
Moon's declination	−24 4 57.9	Hourly motion	+ 1 0.1
Sun's equa. hor. parallax	8.9	Sun's true semidiameter	16 15.0
Moon's equa. hor. parallax	58 2.5	Moon's true semidiameter	15 48.2

CIRCUMSTANCES OF THE ECLIPSE.

		Greenwich Mean Time.	Longitude from Greenwich.	Latitude.
		d h m	° ′	° ′
Eclipse begins	Dec.	13 19 9.7	+ 36 6.9	−34 48.4
Central eclipse begins		13 20 43.8	+ 87 52.7	−59 1.9
Central eclipse at local apparent midnight		13 21 23.4	+142 12.8	−89 56.6
Central eclipse ends		13 22 10.5	−155 41.2	−56 7.8
Eclipse ends		13 23 44.5	−107 27.1	−31 1.9

I.—*A Total Eclipse of the Moon*, 1917, December 27, visible at Wash- the beginning visible generally in North and South America, through- Pacific Ocean, and the extreme northeastern portion of Asia; the visible generally in North America, throughout the Pacific Ocean, in Asia, and Australia.

ELEMENTS OF THE ECLIPSE.

Greenwich mean time of ☍ in right ascension, December 27d 21h 53m 49.2s

	h m s		s
n's right ascension	18 26 39.29	Hourly motion	11.08
oon's right ascension	6 26 39.29	Hourly motion	138.74
	° ′ ″		′ ″
n's declination	−23 18 30.5	Hourly motion	+ 0 7.1
oon's declination	+22 52 58.5	Hourly motion	4 26.5
n's equa. hor. parallax	8.9	Sun's true semidiameter	16 15.9
oon's equa. hor. parallax	56 20.1	Moon's true semidiameter	15 20.3

CIRCUMSTANCES OF THE ECLIPSE.

		d	h	m	
oon enters penumbra	Dec.	27	18	53.5	Greenwich Mean Time.
oon enters shadow		27	20	5.1	
otal eclipse begins		27	21	38.1	
iddle of the eclipse		27	21	46.3	
otal eclipse ends		27	21	54.6	
oon leaves shadow		27	23	27.4	
oon leaves penumbra		27	24	38.8	

ntacts of Shadow ith Moon's Limb.	Angles of Position from the North Point.	The Moon being in the Zenith in Longitude from Greenwich	and in Latitude
	°	° ′	° ′
First	72 to E.	+121 52	+23 1
Last	55 to W.	+170 39	+22 46

Magnitude of the eclipse=1.011 (Moon's diameter=1.0).

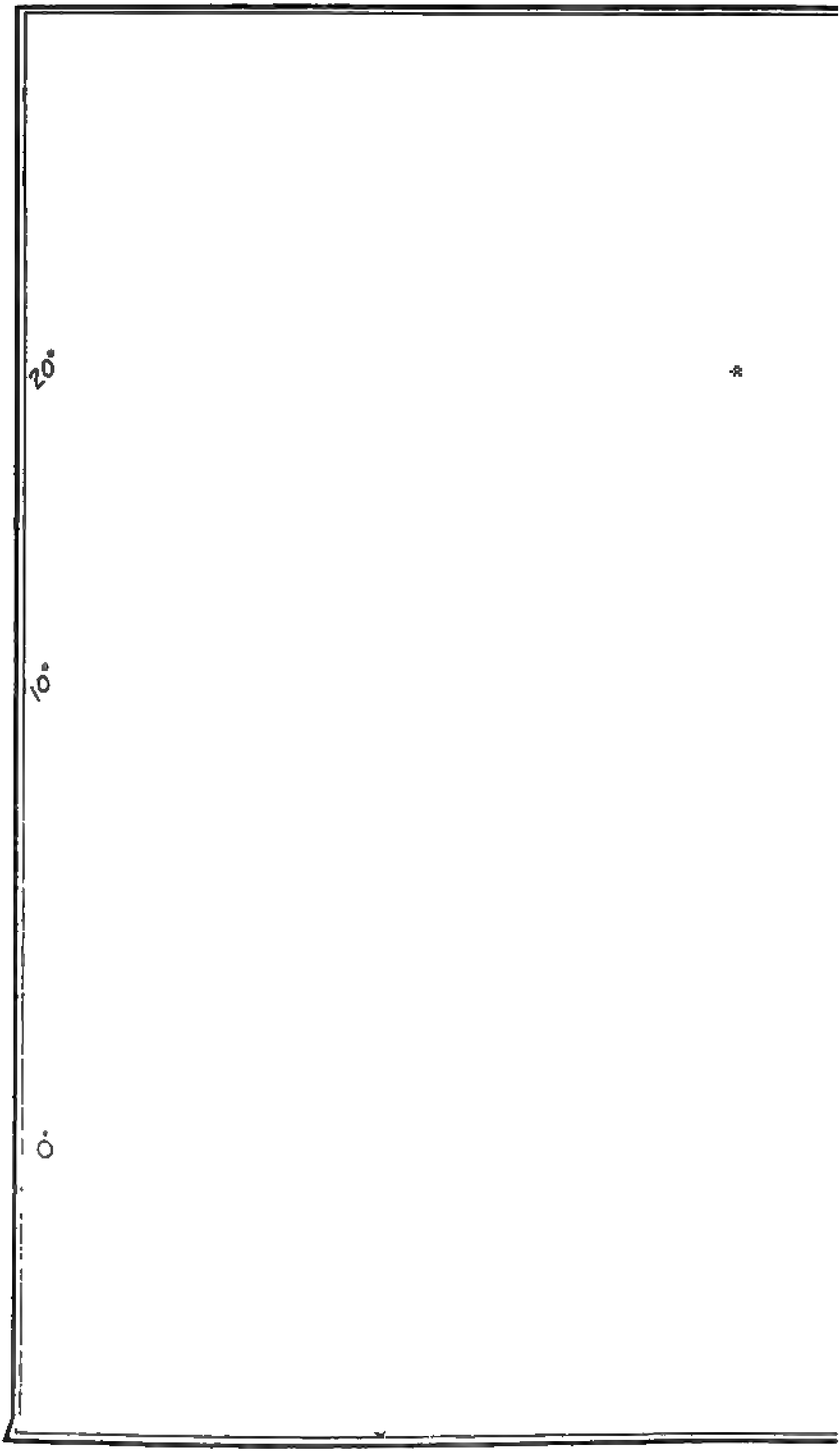
e regions within which the first, second, and fourth eclipses of the Sun ble are laid down on the accompanying charts, from which, by means lotted lines, the Greenwich mean times of beginning and ending at any ay be found with an uncertainty which will vary from three or four s for a high Sun to fifteen or twenty minutes when the Sun is near izon.

BESSELIAN ELEMENTS OF THE PARTIAL ECLIPSE OF THE 1917, JANUARY 22.

Greenwich Mean Time.	Coordinates of Center of Shadow on Fundamental Plane.		Direction of Axis of Shadow.			R Pen Fun I
	x	y	Log sin d	Log cos d	μ	
h m					° ′	
17 40	−1.36546	+0.75266	−9.52507	+9.97415	262 1.8	+0.
50	1.27351	0.78377	9.52504	9.97415	264 31.8	0.
18 0	−1.18156	+0.81488	−9.52501	+9.97416	267 1.8	+0.
10	1.08961	0.84600	9.52497	9.97416	269 31.7	0.
20	0.99765	0.87713	9.52494	9.97416	272 1.7	0.
30	0.90570	0.90826	9.52491	9.97417	274 31.7	0.
40	0.81374	0.93939	9.52487	9.97417	277 1.7	0.
50	0.72179	0.97053	9.52484	9.97418	279 31.7	0.
19 0	−0.62983	+1.00167	−9.52481	+9.97418	282 1.7	+0
10	0.53788	1.03282	9.52478	9.97419	284 31.7	0
20	0.44593	1.06397	9.52474	9.97419	287 1.7	0
30	0.35397	1.09513	9.52471	9.97419	289 31.6	0
40	0.26202	1.12629	9.52468	9.97420	292 1.6	0
50	0.17007	1.15746	9.52465	9.97420	294 31.6	0
20 0	−0.07812	+1.18863	−9.52461	+9.97421	297 1.6	+0
10	+0.01382	1.21980	9.52458	9.97421	299 31.6	0
20	0.10577	1.25098	9.52455	9.97421	302 1.6	0
30	0.19771	1.28216	9.52451	9.97422	304 31.6	0
40	0.28964	1.31335	9.52448	9.97422	307 1.6	0
50	0.38158	1.34454	9.52445	9.97423	309 31.5	0
21 0	+0.47351	+1.37573	−9.52442	+9.97423	312 1.5	+0
10	0.56544	1.40693	9.52438	9.97423	314 31.5	0.
20	+0.65737	+1.43813	−9.52435	+9.97424	317 1.5	+0.

Greenwich Mean Time.	Log x′ for 1 Minute.	Log y′ for 1 Minute.	Log μ′ for 1 Minute.	Log Tangent o of Cone
				Penumbr
h m				
17 0	+7.9635	+7.4925	+1.1761	+7.6766
18 0	7.9636	7.4930	1.1761	7.6766
19 0	7.9636	7.4934	1.1761	7.6766
20 0	7.9635	7.4938	1.1761	7.6766
21 0	7.9635	7.4941	1.1761	7.6766
22 0	+7.9633	+7.4943	+1.1761	+7.6766

PARTIAL ECLIPS



Note – The hours of begin

UARY 22nd 1917

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PARTIAL ECl

Note The hours of beginn

JUNE 18th-19th 1917.

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essed in Mean Time

LIAN ELEMENTS OF THE PARTIAL ECLIPSE OF THE SUN, 1917, JUNE 18–19.

Coordinates of Center of Shadow on Fundamental Plane.		Direction of Axis of Shadow.			Radius of Penumbra on Fundamental Plane.
x	*y*	Log sin *d*	Log cos *d*	*μ*	*l*
				° ′	
−0.82353	+1.35363	+9.59939	+9.96264	352 15.0	+0.55664
0.73650	1.34691	9.59939	9.96264	354 45.0	0.55666
0.64946	1.34019	9.59940	9.96264	357 15.0	0.55668
−0.56242	+1.33345	+9.59940	+9.96264	359 45.0	+0.55670
0.47538	1.32670	9.59940	9.96264	2 15.0	0.55672
0.38834	1.31993	9.59940	9.96264	4 45.0	0.55674
0.30131	1.31316	9.59941	9.96264	7 14.9	0.55676
0.21427	1.30637	9.59941	9.96264	9 44.9	0.55678
0.12723	1.29958	9.59941	9.96264	12 14.9	0.55680
−0.04020	+1.29277	+9.59941	+9.96264	14 44.9	+0.55682
+0.04683	1.28594	9.59942	9.96264	17 14.9	0.55683
0.13387	1.27911	9.59942	9.96264	19 44.9	0.55685
0.22089	1.27227	9.59942	9.96264	22 14.9	0.55687
0.30792	1.26541	9.59942	9.96264	24 44.9	0.55688
0.39495	1.25854	9.59942	9.96264	27 14.9	0.55690
+0.48197	+1.25166	+9.59943	+9.96264	29 44.9	+0.55691
0.56899	1.24477	9.59943	9.96264	32 14.9	0.55692
0.65601	1.23787	9.59943	9.96264	34 44.8	0.55694
0.74302	1.23095	9.59943	9.96264	37 14.8	0.55695
0.83004	1.22403	9.59944	9.96264	39 44.8	0.55696
0.91704	1.21709	9.59944	9.96264	42 14.8	0.55697
+1.00405	+1.21014	+9.59944	+9.96263	44 44.8	+0.55699

Log *x′* for 1 Minute.	Log *y′* for 1 Minute.	Log *μ′* for 1 Minute.	Log Tangent of Angle of Cone. Penumbra.
+7.9397	−6.8243	+1.1761	+7.66289
7.9397	6.8290	1.1761	7.66289
7.9397	6.8335	1.1761	7.66289
7.9396	6.8380	1.1761	7.66289
+7.9395	−6.8423	+1.1761	+7.66289

BESSELIAN ELEMENTS OF THE PARTIAL ECLIPSE OF THE 1917, JULY 18.

Greenwich Mean Time.	Coordinates of Center of Shadow on Fundamental Plane.		Direction of Axis of Shadow.			Ra Pen Fund
	x	y	Log sin d	Log cos d	μ	
h m					° ′	
13 50	−0.85266	−1.32437	+9.55426	+9.97016	205 59.5	+0
14 0	−0.77088	−1.34822	+9.55423	+9.97017	208 29.5	+0
10	0.68911	1.37206	9.55421	9.97017	210 59.6	0
20	0.60734	1.39591	9.55419	9.97017	213 29.6	0
30	0.52556	1.41977	9.55416	9.97018	215 59.6	0
40	0.44379	1.44362	9.55414	9.97018	218 29.6	0
50	0.36202	1.46748	9.55412	9.97018	220 59.6	0
15 0	−0.28025	−1.49135	+9.55409	+9.97019	223 29.6	+0
10	0.19849	1.51522	9.55407	9.97019	225 59.6	0
20	0.11672	1.53909	9.55405	9.97019	228 29.6	0
30	−0.03496	−1.56297	+9.55402	+9.97020	230 59.6	+0

Greenwich Mean Time.	Log x′ for 1 Minute.	Log y′ for 1 Minute.	Log μ′ for 1 Minute.	Log Tangent of Co
				Penumb
h m				
13 0	+7.9126	−7.3769	+1.1761	+7.66
14 0	7.9126	7.3774	1.1761	7.66
15 0	7.9126	7.3778	1.1761	7.66
16 0	+7.9125	−7.3782	+1.1761	+7.66

ANNULAR ECLIP

Note.- The hours of beginning

CEMBER 13th 1917

ressed in Mean Time.

IAN ELEMENTS OF THE ANNULAR ECLIPSE OF THE SUN,
1917, R 13.

MEAN PLACES FOR 1917.0. (January $0^d.431$, Greenwich.)

Name of Star.		Magnitude.	Right Ascension.	Annual Proper Motion.	Declination.	A Prop
			h m s	s	° ′ ″	
36	Piscium . . .	6.2	0 12 18.061	−0.0027	+ 7 46 46.28	
d	Piscium . . .	5.4	0 16 19.561	+0.0003	7 43 45.86	
136 B.	Piscium . . .	6.5	0 36 54.451	−0.0064	8 54 8.23	
58	Piscium . . .	5.7	0 42 41.549	+0.0033	11 31 17.34	
75	Piscium . . .	6.3	1 2 11.506	+0.0012	12 30 41.64	
η	Piscium . . .	3.7	1 27 2.336	+0.0015	+14 55 6.06	
101	Piscium . . .	6.2	1 31 20.025	+0.0010	14 14 15.15	
105	Piscium . . .	6.1	1 35 11.944	+0.0053	15 59 6.69	
3	Arietis . . .	6.4	1 42 4.759	+0.0031	16 59 51.57	
4	Arietis . . .	5.8	1 43 40.616	+0.0035	16 32 34.23	
ι	Arietis . . .	5.1	1 52 48.778	+0.0021	+17 24 45.99	
35 B.	Arietis . . .	6.4	1 59 9.265	−0.0008	17 51 17.54	
47 B.	Arietis . . .	6.5	2 3 12.281	−0.0037	17 38 4.20	
20 H[1].	Arietis . . .	6.4	2 4 49.346	+0.0112	16 50 8.00	
15	Arietis . . .	5.9	2 6 1.337	+0.0059	19 6 33.12	
θ	Arietis . . .	5.6	2 13 30.336	−0.0007	+19 31 4.04	
26	Arietis . . .	6.2	2 25 58.908	+0.0050	19 29 15.37	
μ	Arietis . . .	5.7	2 37 40.977	+0.0023	19 39 30.88	
47	Arietis . . .	5.8	2 53 19.960	+0.0160	20 20 12.17	
ε	Arietis (*mean*) .	4.6	2 54 27.735	−0.0009	21 0 32.67	
ζ	Arietis . . .	5.0	3 10 7.630	−0.0019	+20 44 15.26	
τ	Arietis . . .	5.2	3 16 25.929	+0.0023	20 50 54.99	
63	Arietis . . .	5.2	3 17 58.432	−0.0032	20 26 45.94	
65	Arietis . . .	6.0	3 19 38.782	+0.0006	20 30 35.22	
66	Arietis . . .	6.1	3 23 35.276	+0.0006	22 31 7.40	
7	Tauri . . .	5.9	3 29 31.506	+0.0013	+24 11 12.88	
16	Tauri . . .	5.4	3 39 51.960	+0.0009	24 1 45.17	
17	Tauri . . .	3.8	3 39 56.601	+0.0016	23 51 11.68	
18	Tauri . . .	5.6	3 40 12.351	+0.0004	24 34 47.38	
q	Tauri . . .	4.3	3 40 15.798	+0.0010	24 12 28.48	
20	Tauri . . .	4.1	3 40 53.075	+0.0016	+24 6 33.49	
21	Tauri . . .	5.8	3 40 57.563	+0.0012	24 17 46.73	
22	Tauri . . .	6.5	3 41 6.003	+0.0006	24 16 11.48	
23	Tauri . . .	4.3	3 41 23.796	+0.0017	23 41 26.18	
η	Tauri . . .	3.0	3 42 32.843	+0.0016	23 50 57.71	
104 B.	Tauri . . .	5.5	3 43 25.782	+0.0008	+23 10 1.59	
27	Tauri . . .	3.7	3 44 13.414	+0.0013	23 48 1.89	
28	Tauri . . .	5.2	3 44 14.703	+0.0009	23 53 2.52	
133 B.	Tauri . . .	5.9	3 45 2.197	+0.0025	21 59 33.03	
32	Tauri . . .	5.8	3 51 57.597	+0.0045	22 14 23.34	
33	Tauri . . .	6.0	3 52 8.478	+0.0026	+22 56 7.97	
161 B.	Tauri . . .	6.5	3 56 1.098	+0.0027	22 58 4.20	
36	Tauri . . .	5.6	3 59 23.644	+0.0001	23 52 41.81	
192 B.	Tauri . . .	6.1	4 7 55.709	−0.0016	22 12 3.44	
χ	Tauri . . .	5.3	4 17 31.756	+0.0028	25 26 3.70	
62	Tauri . . .	6.1	4 18 59.363	+0.0008	+24 6 30.79	
υ	Tauri . . .	4.2	4 21 20.313	+0.0079	22 37 34.72	
72	Tauri . . .	5.4	4 22 19.497	+0.0004	22 48 37.13	
284 B.	Tauri . . .	6.0	4 31 29.183	+0.0109	23 10 19.34	
τ	Tauri . . .	4.3	4 37 15.692	+0.0007	22 47 55.34	
95	Tauri . . .	6.2	4 38 12.128	+0.0014	+23 55 57.12	

AN PLACES FOR 1917.0. (January 0^d.431, Greenwich.)

of Star.	Magnitude.	Right Ascension.	Annual Proper Motion.	Declination.	Annual Proper Motion.
		h m s	s	° ′ ″	″
. . .	6.2	4 40 41.687	+0.0005	+23 28 36.43	+0.004
. . .	6.3	4 51 12.205	−0.0001	24 27 37.89	−0.033
. . .	6.0	4 52 46.381	+0.0003	23 49 11.34	−0.035
. . .	5.6	4 53 4.532	+0.0023	24 55 23.31	−0.061
. . .	5.5	5 3 3.077	+0.0003	24 9 22.94	−0.021
. . .	5.4	5 24 9.974	+0.0015	+25 5 3.37	−0.038
. . .	5.1	5 30 22.901	+0.0010	23 59 7.42	−0.031
. . .	5.1	5 34 35.552	+0.0018	25 51 5.78	−0.029
. . .	6.0	5 38 17.090	+0.0011	23 9 56.91	−0.042
. . .	5.0	5 43 55.306	0.0000	24 32 26.80	−0.023
. . .	5.8	5 51 51.154	. . . .	+24 14 18.91	. . .
. . .	4.7	5 52 50.641	0.0000	25 56 40.93	−0.007
norum . .	4.3	5 59 4.505	+0.0002	23 16 7.83	−0.109
norum . .	5.6	6 4 41.651	+0.0014	23 7 41.32	+0.001
norum . .	5.9	6 6 26.941	+0.0011	24 26 22.44	−0.061
norum . .	6.3	6 7 17.244	+0.0007	+22 55 41.85	−0.013
norum (*var.*) .	3.2	6 9 52.098	−0.0038	22 31 54.92	−0.016
norum . .	6.1	6 11 14.787	−0.0009	23 59 52.01	−0.026
norum . .	6.2	6 11 54.920	+0.0004	23 46 12.13	−0.008
norum . .	3.2	6 17 56.386	+0.0046	22 33 26.30	−0.114
inorum . .	6.0	6 20 30.284	−0.0004	+23 22 27.44	+0.015
inorum . .	6.5	6 32 21.972	−0.0021	24 39 38.50	−0.002
inorum . .	3.2	6 38 49.590	−0.0001	25 12 51.95	−0.018
inorum . .	5.2	6 46 34.693	+0.0003	21 51 36.19	−0.045
inorum . .	5.8	6 46 57.780	−0.0006	23 42 2.93	−0.021
inorum . .	5.2	6 57 21.435	−0.0003	+24 20 5.47	0.000
inorum (*var.*) .	3.7	6 59 11.248	−0.0002	20 41 35.05	−0.007
inorum . .	5.9	7 0 18.650	0.0000	22 45 45.91	−0.020
inorum . .	6.5	7 5 11.403	−0.0082	21 23 33.90	−0.448
inorum . .	3.5	7 15 10.085	−0.0010	22 8 10.35	−0.015
inorum . .	5.2	7 17 3.070	−0.0044	+20 36 4.88	−0.025
inorum . .	6.0	7 18 28.960	−0.0022	23 6 21.33	−0.054
inorum . .	6.4	7 21 56.062	−0.0219	21 42 9.15	−0.022
inorum . .	5.8	7 22 2.878	−0.0002	20 25 27.48	−0.023
inorum . .	5.3	7 22 48.886	−0.0035	21 36 58.09	−0.110
inorum . .	6.3	7 40 17.070	−0.0013	+20 30 58.44	−0.012
inorum . .	5.0	7 41 19.247	−0.0048	18 42 48.58	−0.063
inorum . .	6.2	7 47 7.258	−0.0029	19 32 18.85	−0.030
inorum . .	5.2	7 50 49.393	−0.0011	20 6 14.43	−0.043
inorum . .	6.8	7 55 57.875	−0.0018	20 2 40.83	−0.007
ri . . .	5.7	7 56 2.077	−0.0001	+17 32 13.11	−0.010
ri . . .	6.1	7 59 57.582	−0.0020	19 4 38.61	−0.046
ri (*mean*) . .	4.7	8 7 27.241	+0.0051	17 53 56.75	−0.129
ri . . .	5.9	8 18 36.816	−0.0038	18 35 58.31	−0.031
ri . . .	6.2	8 21 8.140	−0.0132	17 19 14.35	−0.153
ri . . .	5.5	8 26 51.941	−0.0039	+18 22 32.20	−0.068
ri . . .	6.3	8 31 28.571	+0.0006	15 36 5.07	−0.027
ri . . .	6.3	8 46 24.249	−0.0075	15 39 33.47	+0.076
ri . . .	5.1	8 52 37.325	+0.0041	15 38 30.60	+0.022
ri . . .	5.7	8 52 57.216	+0.0043	15 54 2.86	+0.023
ri . . .	6.5	9 5 15.952	−0.0008	+11 54 11.11	−0.079

MEAN PLACES FOR 1917.0. (January 0d.431, Greenwich.)

Name of Star.		Magnitude.	Right Ascension.	Annual Proper Motion.	Declination.	A Prop
			h m s	s	° ′ ″	
81	Cancri	6.4	9 7 45.207	−0.0359	+15 19 52.49	
222 B.	Cancri	6.3	9 13 21.711	+0.0046	11 50 57.72	
ξ	Leonis	5.1	9 27 28.447	−0.0063	11 40 4.89	
h	Leonis	5.2	9 27 30.786	+0.0001	10 4 56.78	
o	Leonis	3.8	9 36 43.370	−0.0096	10 16 14.25	
83 B.	Leonis	5.9	9 52 2.016	−0.0075	+ 9 19 37.42	
89 B.	Leonis	6.2	9 53 43.926	+0.0010	8 42 38.46	
π	Leonis	4.9	9 55 49.720	−0.0029	8 26 34.70	
14	Sextantis	6.3	10 2 27.099	−0.0023	6 1 0.98	
43	Leonis	6.3	10 18 39.932	−0.0017	6 57 52.26	
155 B.	Leonis	6.5	10 18 56.009	−0.0167	+ 6 6 56.43	
35	Sextantis	6.1	10 39 2.515	+0.0018	5 11 1.26	
237 B.	Leonis	6.3	10 47 57.895	+0.0002	1 27 55.02	
55	Leonis	6.1	10 51 26.255	+0.0073	1 10 46.69	
p^3	Leonis	6.1	10 59 21.719	−0.0045	0 26 47.06	
p^4	Leonis	5.7	11 2 40.246	−0.0253	+ 2 24 23.26	
p^5	Leonis	5.3	11 9 30.665	−0.0029	0 22 56.19	
359 B.	Leonis	6.3	11 19 2.972	−0.0024	+ 0 35 16.21	
388 B.	Leonis	6.3	11 23 39.253	−0.0025	− 1 14 34.43	
e	Leonis	5.1	11 26 4.456	+0.0018	2 32 42.85	
431 B.	Leonis	6.2	11 34 9.581	−0.0028	− 1 58 37.02	
13 B.	Virginis	5.9	11 46 47.658	+0.0008	4 52 17.75	
64 B.	Virginis	6.5	12 6 11.672	−0.0004	7 18 45.30	
78 B.	Virginis	6.5	12 10 0.320	−0.0051	5 15 27.62	
q	Virginis	5.3	12 29 29.633	−0.0057	8 59 39.19	
370 B.	Virginis	6.0	12 49 59.434	−0.0058	−11 11 55.66	
69	Virginis	4.9	13 23 1.377	−0.0086	15 32 36.72	
75	Virginis	5.6	13 28 25.411	−0.0050	14 56 10.72	
83	Virginis	5.6	13 40 0.939	+0.0007	15 45 43.43	
85	Virginis	6.1	13 41 6.770	−0.0029	15 21 3.19	
87	Virginis	5.8	13 42 54.232	+0.0025	−17 26 41.30	
89	Virginis	5.1	13 45 21.487	−0.0077	17 43 16.12	
214 G.	Virginis	6.5	14 0 42.318	−0.0036	15 56 20.31	
43 H.	Virginis	5.5	14 10 49.466	−0.0031	17 48 50.20	
231 G.	Virginis	6.4	14 12 28.259	−0.0005	18 12 0.11	
236 G.	Virginis	5.7	14 14 2.704	−0.0039	−18 19 54.48	
9 G.	Libræ	6.5	14 30 10.364	+0.0032	20 4 32.31	
17 G.	Libræ	6.4	14 41 28.209	−0.0047	20 49 28.80	
18 G.	Libræ	6.1	14 42 30.284	−0.0032	20 58 38.29	
43 B.	Libræ	5.7	14 52 36.945	+0.0746	21 2 32.52	
47 G.	Libræ	6.1	15 1 39.657	+0.0066	−21 42 34.40	
64 G.	Libræ	5.8	15 11 34.108	−0.0028	22 5 34.49	
153 B.	Libræ	6.3	15 28 14.106	−0.0006	24 12 29.89	
169 B.	Libræ	6.0	15 32 55.078	−0.0017	22 52 0.86	
177 B.	Libræ	6.2	15 34 28.253	−0.0016	22 52 46.25	
42	Libræ	5.0	15 35 22.266	−0.0018	−23 32 56.98	
A	Scorpii	4.6	15 48 37.514	−0.0017	25 4 48.20	
31 B.	Scorpii	5.4	15 48 56.179	−0.0022	24 17 12.36	
32 B.	Scorpii	5.3	15 48 59.250	−0.0023	23 43 53.18	
3	Scorpii	5.9	15 49 40.271	−0.0031	−24 59 54.58	

AN PLACES FOR 1917.0. (January 0^d.431, Greenwich.)

MEAN PLACES FOR 1917.0. (January 0ᵈ.431, Greenwich.)

Name of Star.	Magnitude.	Right Ascension.	Annual Proper Motion.	Declination.	An Propo
		h m s	s	° ′ ″	
168 B. Sagittarii	6.3	18 56 37.599	+0.0005	−22 48 47.45	+
ο Sagittarii	3.9	18 59 42.583	+0.0050	21 51 50.76	-
191 B. Sagittarii	6.5	19 3 43.633	−0.0011	23 19 19.94	-
π Sagittarii	3.0	19 4 49.713	−0.0005	21 9 23.62	-
199 B. Sagittarii	6.4	19 7 30.461	−0.0003	21 47 49.75	-
222 B. Sagittarii	5.5	19 15 39.745	−0.0016	−22 33 28.51	+
50 Sagittarii	5.5	19 21 22.193	+0.0019	21 56 30.86	.
253 B. Sagittarii	6.1	19 25 58.579	+0.0026	21 29 8.75	.
266 B. Sagittarii	6.1	19 31 35.803	+0.0003	19 2 13.39	.
f Sagittarii	5.1	19 41 31.295	−0.0099	19 57 41.56	.
57 Sagittarii	6.0	19 47 22.702	+0.0001	−19 15 23.95	.
σ Capricorni	5.5	20 14 36.382	−0.0002	19 22 42.17	.
π Capricorni	5.2	20 22 34.314	+0.0004	18 29 4.29	.
31 B. Capricorni	6.4	20 24 3.064	+0.0013	16 1 0.64	.
ρ Capricorni	5.0	20 24 7.690	−0.0013	18 5 20.02	.
ο Capricorni	5.6	20 25 8.531	+0.0012	−18 51 31.30	.
27 G. Capricorni	6.2	20 26 25.300	−0.0058	15 20 5.34	.
47 B. Capricorni	6.2	20 30 50.554	+0.0055	16 48 42.46	.
τ Capricorni	5.2	20 34 38.003	+0.0006	15 14 47.84	.
61 B. Capricorni	5.9	20 35 52.876	−0.0032	16 25 12.50	.
94 B. Capricorni	5.7	20 53 2.004	+0.0046	−16 21 4.93	.
95 B. Capricorni	5.9	20 54 6.283	....	14 48 15.32	
ν Aquarii	4.5	21 5 4.447	+0.0057	11 42 30.02	.
53 B. Aquarii	6.5	21 11 26.929	+0.0004	13 32 48.83	.
18 Aquarii	5.5	21 19 39.440	+0.0054	13 14 6.00	.
19 Aquarii	5.6	21 20 45.525	+0.0012	−10 6 9.10	
72 B. Aquarii	6.5	21 23 44.115	−0.0045	11 55 42.05	
137 B. Capricorni	6.2	21 35 0.512	+0.0001	10 57 2.84	
c^1 Capricorni	5.3	21 40 34.815	+0.0004	9 27 50.63	
c^2 Capricorni	6.3	21 41 50.672	+0.0008	9 39 34.32	
λ Capricorni	5.5	21 42 4.124	+0.0015	−11 44 57.30	
96 B. Aquarii	6.5	21 49 9.841	−0.0001	10 42 10.48	
30 Aquarii	5.6	21 58 54.494	+0.0011	6 55 25.82	
θ Aquarii	4.3	22 12 27.295	+0.0074	8 11 49.13	
44 Aquarii	5.7	22 12 46.581	−0.0003	5 48 7.35	
ρ Aquarii	5.3	22 15 49.967	+0.0008	− 8 14 18.57	
170 B. Aquarii	6.0	22 19 11.092	+0.0012	7 36 51.56	
51 Aquarii	5.8	22 19 47.505	+0.0011	5 15 26.67	
186 B. Aquarii	6.1	22 26 57.266	+0.0129	6 58 45.38	
187 B. Aquarii	6.3	22 27 0.907	−0.0051	3 20 11.42	
κ Aquarii	5.2	22 33 27.532	−0.0049	− 4 39 23.29	
207 B. Aquarii	6.3	22 36 30.325	....	3 59 10.07	
6 G. Piscium	6.2	22 53 59.129	+0.0002	2 50 24.24	
3 Piscium	6.3	22 56 22.554	+0.0028	0 15 36.20	
22 B. Piscium	6.4	23 19 16.465	+0.0043	− 0 9 51.61	
κ Piscium	4.9	23 22 40.659	+0.0056	+ 0 48 4.07	
9 Piscium	6.4	23 22 59.697	+0.0032	0 39 59.78	
16 Piscium	5.7	23 32 9.143	−0.0074	1 38 29.43	
19 Piscium	5.4	23 42 8.970	−0.0034	3 1 34.68	.
ω Piscium	4.0	23 55 2.897	+0.0102	+ 6 24 13.92	.

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JANUARY.

The Star's Name.	Mag.	Red'ns from 1917.0. Δα	Δδ	Apparent Declination.	At Conjunction in R. A. Greenwich Mean Time.	Hour Angle, H.	Y	x'	y'	Limiting Parallels. N.	S.
		s	"	° '	d h m	h m				°	°
Piscium	3.7	+1.30	+10.8	+14 55.3	1 5 3.1	− 1 40.8	−0.1227	0.5351	+0.2082	+35	−42
Piscium	6.2	1.33	10.6	14 14.4	7 5.4	+ 0 17.6	+1.0164	0.5357	0.2055	+90	+21
Piscium	6.1	1.35	11.1	15 59.3	8 55.4	+ 2 4.0	−0.4510	0.5361	0.2029	+17	−60
Arietis	6.4	1.40	11.4	17 0.1	12 10.6	+ 5 12.8	−0.8678	0.5370	0.1981	− 7	−73
Arietis	5.8	1.41	11.2	16 32.8	12 55.9	+ 5 56.6	−0.2387	0.5372	0.1970	+29	−47
Arietis	5.1	+1.47	+11.4	+17 25.0	17 14.0	+10 6.3	−0.3255	0.5383	+0.1905	+24	−51
B. Arietis	6.4	1.51	11.5	17 51.5	20 12.5	−11 1.1	−0.2344	0.5392	0.1858	+29	−46
B. Arietis	6.5	1.54	11.4	17 38.3	22 6.3	− 9 11.0	+0.3488	0.5398	0.1828	+62	−15
I^{1}. Arietis	6.4	1.54	11.1	16 50.3	22 51.6	− 8 27.1	+1.3349	0.5400	0.1815	+72	+60
Arietis	5.9	1.56	11.8	19 6.7	23 25.2	− 7 54.6	−0.9777	0.5402	0.1806	−15	−71
Arietis	5.6	+1.61	+11.8	+19 31.3	2 2 54.5	− 4 32.3	−0.7937	0.5413	+0.1747	− 3	−70
Arietis	6.2	1.69	11.6	19 29.5	8 41.6	+ 1 3.2	+0.2196	0.5431	0.1646	+54	−19
Arietis	5.7	1.76	11.4	19 39.7	14 5.2	+ 6 16.0	+0.8998	0.5448	0.1548	+90	+19
Arietis	5.8	1.86	11.2	20 20.4	21 15.0	−10 48.7	+1.2370	0.5470	0.1410	+87	+49
Arietis (*mean*)	4.6	1.88	11.3	21 0.7	21 45.9	−10 18.8	+0.5885	0.5472	0.1400	+83	+ 3
Arietis	6.1	+2.06	+10.7	+22 31.3	3 10 57.2	+ 2 25.5	+0.6384	0.5510	+0.1129	+89	+ 8
Tauri	5.9	2.11	11.0	24 11.4	13 37.3	+ 5 0.0	−0.8679	0.5517	0.1072	− 9	−66
Tauri	5.4	2.17	10.5	24 1.9	18 15.4	+ 9 28.6	−0.2250	0.5528	0.0971	+29	−36
Tauri	3.8	2.17	10.5	23 51.4	18 17.5	+ 9 30.6	−0.0314	0.5528	0.0970	+40	−25
Tauri	5.6	2.18	10.7	24 35.0	18 24.5	+ 9 37.4	−0.8057	0.5528	0.0967	− 5	−65
Tauri	4.3	+2.17	+10.6	+24 12.7	18 26.1	+ 9 38.9	−0.4011	0.5528	+0.0967	+19	−46
Tauri	4.1	2.17	10.5	24 6.7	18 42.7	+ 9 55.0	−0.2677	0.5529	0.0961	+26	−38
Tauri	5.8	2.18	10.6	24 18.0	18 44.7	+ 9 56.9	0.4667	0.5529	0.0960	+15	−50
Tauri	6.5	2.18	10.6	24 16.4	18 48.5	+10 0.6	−0.4321	0.5529	0.0958	+17	−48
Tauri	4.3	2.17	10.4	23 41.6	18 56.5	+10 8.3	+0.2071	0.5529	0.0955	+54	−13
Tauri	3.0	+2.18	+10.4	+23 51.1	19 27.3	+10 38.0	+0.0843	0.5531	+0.0944	+46	−19
B. Tauri	5.5	2.18	10.2	23 10.2	19 51.0	+11 0.9	+0.8595	0.5532	0.0935	+90	+23
Tauri	3.7	2.19	10.3	23 48.2	20 12.3	+11 21.4	+0.2073	0.5532	0.0928	+54	−12
Tauri	5.2	2.19	10.3	23 53.2	20 12.8	+11 21.9	+0.1178	0.5532	0.0927	+49	−17
Tauri	5.6	2.27	9.6	23 52.9	4 2 58.0	− 6 6.8	+0.7002	0.5545	0.0775	+90	+16
Tauri	5.3	+2.38	+ 9.1	+25 26.2	11 1.2	+ 1 39.5	−0.4397	0.5557	+0.0588	+17	−45
Tauri	6.1	2.37	8.7	24 6.7	11 40.1	+ 2 17.1	+1.0402	0.5558	0.0574	+90	+39
B. Tauri	6.3	2.52	7.1	24 27.8	5 1 55.9	− 7 57.0	+1.2419	0.5564	0.0238	+80	+61
Tauri	5.6	2.53	7.1	24 55.5	2 45.6	− 7 9.0	+0.7556	0.5564	+0.0218	+90	+24
Tauri	5.4	2.64	5.2	25 5.1	16 33.3	+ 6 9.8	+0.6574	0.5552	−0.0109	+90	+20
Tauri	5.1	+2.69	+ 4.7	+25 51.2	21 12.2	+10 39.1	−0.2605	0.5544	−0.0218	+27	−30
Tauri	5.0	2.69	3.9	24 32.5	6 1 22.6	− 9 19.2	+1.0691	0.5535	0.0316	+90	+44
B. Tauri	5.8	2.70	3.4	24 14.4	4 56.2	− 5 52.9	+1.2756	0.5527	0.0397	+66	+65
Tauri	4.7	2.74	3.5	25 56.7	5 22.9	− 5 27.1	−0.6195	0.5526	0.0408	+ 6	−56
Geminorum	5.9	2.74	2.4	24 26.4	11 31.3	+ 0 28.7	+0.7449	0.5508	0.0547	+90	+20
Geminorum	6.1	+2.74	+ 2.1	+23 59.9	13 41.8	+ 2 34.8	+1.1080	0.5501	−0.0596	+90	+44
B. Geminorum	6.5	2.78	0.7	24 39.7	23 20.8	+11 54.2	−0.2991	0.5465	0.0806	+24	−38
Geminorum	3.2	2.80	+ 0.3	25 12.9	7 2 19.6	− 9 13.0	−1.1606	0.5454	0.0869	−34	−65
B. Geminorum	5.8	2.78	− 0.4	23 42.0	6 5.8	− 5 34.2	+0.1698	0.5437	0.0947	+52	−14
Geminorum	5.2	2.80	1.1	24 20.1	10 57.0	− 0 52.7	−1.0150	0.5415	0.1045	−20	−66
Geminorum	5.9	+2.76	− 1.3	+22 45.7	12 20.2	+ 0 27.7	+0.5781	0.5409	−0.1072	+82	+ 5
Geminorum	3.5	2.76	2.3	22 8.1	19 21.6	+ 7 15.6	+0.4714	0.5375	0.1207	+72	− 2
Geminorum	6.0	2.77	2.5	23 6.3	20 56.4	+ 8 47.2	−0.7960	0.5367	0.1237	− 4	−67
B. Geminorum	6.4	2.74	2.8	21 42.1	22 35.4	+10 23.0	+0.5526	0.5358	0.1267	+80	+ 2
Geminorum	*5.3*	*2.74*	*2.8*	*21 36.9*	23 0.7	+10 47.5	+0.5948	0.5356	0.1275	+84	+ 4
Geminorum	*6.3*	*+2.71*	*− 3.9*	*+20 30.9*	8 7 27.0	− 5 2.2	+0.6762	0.5313	−0.1424	+90	+[illegible]

ELEMENTS FOR THE OF OCCULTATIONS

JANUARY.

The Star's						At Conjunction in R. A.				
Name.	Mag.	Red'ns from 1917.0. Δα	Red'ns from 1917.0. Δδ	Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Y	x′	y′
		s	″	° ′	d h m	h m			
209 B. Geminorum	6.2	+2.69	− 4.3	+19 32.2	8 10 47.4	− 1 48.1	+1.2766	0.5296	−0.148
85 Geminorum	5.2	2.69	4.6	20 6.2	[illegible]	− 0 2.4	+0.3775	0.5285	0.150
217 B. Geminorum	6.3	2.69	4.9	20 2.6	15 8.6	+ 2 25.0	+0.0557	0.5272	0.155
SATURN	−0.1	. . .	. . .	20 47.1	17 4.1	+ 4 16.9	−1.0702	0.5300	[illegible]
10 H. Cancri	6.1	2.67	5.1	19 4.6	17 7.4	+ 4 20.0	+0.8200	0.5262	0.158
d^1 Cancri	5.9	+2.63	− 6.2	+18 35.9	9 2 28.0	−10 36.5	−0.1914	0.5213	−0.171
d^2 Cancri	6.2	2.61	6.3	17 19 1	3 44.6	− 9 22.2	+1.0090	[illegible]	0.173
NEPTUNE	7.7	. . .	. . .	19 3.4	5 30 5	− 7 39.5	−1.2299	0.5210	0.176
θ Cancri	5.5	2.61	6.7	18 22 4	6 39.3	− 6 32.7	−0.6747	0.5191	0.177
54 Cancri	6.8	2.58	7.5	15 39.4	16 42.5	+ 3 12.6	+0.4935	[illegible]	0.190
o^1 Cancri	5 1	+2.51	− 7.9	+15 38.4	19 56.8	+ 6 21.2	−0 1093	[illegible]	−0.194
o^2 Cancri	5.7	2.52	7.9	15 53.9	20 7.2	+ 6 31.3	−0.4307	0.5125	0.194
81 Cancri	6 4	2.47	8.6	15 19.7	10 3 54.3	− 9 55.2	−1.3429	0.5090	0.202
ξ Leonis	5.1	2.36	9.0	11 39.9	14 25.9	+ [illegible]	[illegible]	0.5047	0.212
o Leonis	3.8	2.32	9.2	10 16.1	19 25.4	+ 5 9.5	+1.0232	0.5029	0.216
83 B. Leonis	5.9	+2.26	− 9.7	+ 9 19.5	11 3 45.4	−10 44.4	+0.2398	0.5003	−0.222
89 B. Leonis	6.2	[illegible]	9.6	8 42.5	4 41.2	− 9 50.1	+0.7167	0.5001	0.223
π Leonis	4 9	2.24	9.7	8 26.4	5 50.1	− 8 43.1	+0.7[illegible]	0.4997	0.224
48 Leonis	6.3	2.14	10.2	6 57.7	18 25.1	+ 3 31.1	−0.4680	0.4970	0.230
155 B. Leonis	6.5	2.13	10.0	6 6.8	18 34.0	+ 3 39.8	+0.4380	0.4969	0.230
35 Sextantis	6.1	+2 05	−10.4	+ 5 10 8	12 5 43.6	− 9 29.0	−1.1330	[illegible]	−0.23
p^4 Leonis	5.7	1 93	10 4	2 24.2	18 52.4	+ 3 18.3	−1.1781	0 4954	0.23
p^5 Leonis	5.3	1.89	10 0	0 22.8	22 40 4	+ 7 0.2	+0.1457	0.4956	0.23
359 B. Leonis	6.3	1 85	10 2	+ 0 35 1	13 3 57.7	−11 51 2	−1.3419	0.4962	0.23
388 B. Leonis	6.3	1.83	9.8	− 1 14 7	6 30.6	− 9 22 4	+0.0613	0.4965	0.23
e Leonis	5.1	+1 80	− 9 4	− 2 32 9	7 50.8	− 8 4.4	+1.1716	0.4967	−0.23
431 B. Leonis	6.2	1.78	9 7	1 58.8	12 18 2	− 3 44.4	−0.5153	0.4975	0.23
13 B. Virginis	5.9	1.71	9.0	4 52 4	19 13.7	+ 2 59.7	+1 0047	0 4993	0 23
64 B. Virginis	6.5	1.62	8 5	7 18 9	14 5 44.9	−10 46.9	+1.1808	0.5028	0.23
q Virginis	5.3	1.50	8 2	8 59.8	18 8.8	+ 1 15.8	+0.1290	0.5084	0.22
370 B. Virginis	6.0	+1 41	− 7 6	−11 12.1	15 4 48.0	+11 36.3	+0 1061	0 5145	−0.22
69 Virginis	4.9	1.25	6.2	15 32.7	21 23 8	+ 3 41.8	+1.1885	0.5260	0.20
75 Virginis	5 6	1 23	6 4	14 56.3	16 0 2.3	+ 6 15.3	−0 0036	0 5281	0.20
83 Virginis	5.6	1.17	6.1	15 45.8	5 38 4	+11 40.7	−0.2521	0.5326	0.19
85 Virginis	6.1	1.17	6.2	15 21.2	6 9.9	−11 48.8	−0.7922	0.5330	0.19
87 Virginis	5 8	+1.16	− 5.5	−17 26.8	7 1.2	−10 59.2	+1.2609	0.5337	−0.19
89 Virginis	5 1	1.15	5.4	17 43.4	8 11.3	− 9 51.4	+1.3245	0.5347	0.19
43 H. Virginis	5.5	1.03	5.4	17 48 9	20 3.6	+ 1 37.5	−0.7965	0 5452	0.17
231 G. Virginis	6 4	1.02	5.3	18 12 1	20 48.7	+ 2 21.0	−0.5236	0.5459	0.17
236 G. Virginis	5 7	1.02	5.2	18 20.0	21 31.7	+ 3 2.5	−0.5115	0.5465	0.17
9 G. Libræ	6 5	+0.94	− 4.6	20 4.6	17 4 46.7	+10 2.6	+0.0852	0.5534	−0.16
17 G. Libræ	6.4	0.89	4 3	20 49.6	9 45.1	− 9 9 5	+0 0737	0.5581	0.15
18 G. Libræ	6 1	0.89	4.3	20 58 7	10 12.2	− 8 43 3	+0.1630	0.5585	0 15
43 B. Libræ	5.7	0.85	4 3	21 2.6	14 34.7	− 4 30 2	−0 4249	0.5627	0.14
47 G. Libræ	6.1	0.80	4.0	21 42 6	18 26.4	− 0 47.0	−0.2792	0.5664	0.13
64 G. Libræ	5.8	+0.76	− 3.8	−22 5 6	22 36 7	+ 3 14 1	−0.4383	0.5704	−0.12
153 B. Libræ	6.3	0.69	3 1	24 12 6	18 5 30 4	+ 9 52 4	+0.9048	0.5768	0.11
169 B Libræ	6.0	0 67	3 5	22 52 1	7 25.0	+11 42.6	−0.6857	0.5785	0.10
177 B. Libræ	6.2	0.66	3.5	22 52.8	8 2.9	−11 41 0	−0.7406	0.5791	0.10
42 Libræ	5.0	0.66	3.3	23 33.0	8 24 8	−11 19.9	−0.9924	0.5794	0.10
A Scorpii	4.6	+0.61	− 2.8	−25 4.9	13 44.7	− 6 12.3	+0.9414	0.5841	−0.[illegible]

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JANUARY.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1917.0. Δα	Δδ	Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Y	x′	y′	N.	S.
		s	″	° ′	d h m	h m				°	°
3. Scorpii	5.4	+0.60	–3.1	–24 17.3	18 13 52.2	– 6 5.1	+0.1189	0.5842	–0.0929	+29	–35
3. Scorpii	5.3	0.60	3.2	23 43.9	13 53.4	– 6 4.0	–0.4506	0.5842	0.0928	– 1	–71
Scorpii	5.9	0.60	2.8	25 0.0	14 9.8	– 5 48.3	+0.8191	0.5845	0.0921	+65	+ 6
B. Scorpii	5.4	0.59	3.0	24 35.6	15 43.5	– 4 18.2	+0.2632	0.5858	0.0881	+36	–27
B. Scorpii	4.9	0.57	2.6	25 38.1	17 35.8	– 2 30.3	+1.1652	0.5874	0.0832	+64	+35
B. Scorpii	6.4	+0.56	–3.0	–24 29.9	17 50.0	– 2 16.7	–0.0131	0.5876	–0.0826	+21	–42
B. Scorpii	5.7	0.56	3.3	23 22.9	18 42.7	– 1 26.1	–1.2232	0.5883	0.0803	–55	–86
G. Scorpii	6.2	0.55	3.0	24 14.5	19 23.4	– 0 47.0	0.4006	0.5888	0.0785	0	–67
G. Scorpii	5.8	0.54	3.4	23 27.9	19 44.4	– 0 26.9	–1.2181	0.5892	0.0775	–54	–86
G. Scorpii	6.3	0.53	3.0	24 12.7	21 41.8	+ 1 25.8	–0.6043	0.5907	0.0723	–11	–86
B. Scorpii	6.0	+0.52	–2.7	–25 16.1	22 7.4	+ 1 50.4	+0.4388	0.5910	–0.0711	+45	–17
Scorpii	4.9	0.50	3.1	23 58.3	19 0 22.3	+ 4 0.0	–1.0309	0.5927	0.0649	–38	–90
Scorpii	3.1	0.50	2.7	25 23.7	0 34.0	+ 4 11.2	+0.4021	0.5929	0.0644	+43	–19
Scorpii	1.2	0.47	2.4	26 15.0	3 43.5	+ 7 13.0	+1.0769	0.5952	0.0556	+64	+26
Scorpii	4.8	0.46	2.8	24 56.0	4 3.0	+ 7 31.7	–0.2731	0.5954	0.0547	+ 5	–58
B. Scorpii	6.2	+0.46	–2.4	–26 21.5	4 28.9	+ 7 56.5	+1.1455	0.5957	–0.0534	+64	+34
B. Scorpii	6.1	0.42	2.9	24 18.5	8 25.0	+11 43.0	–1.1146	0.5981	0.0421	–47	–90
B. Ophiuchi	6.3	0.36	2.7	24 58.1	15 20.6	– 5 38.6	–0.6677	0.6024	0.0216	–19	–90
Ophiuchi	5.8	0.36	2.7	24 51.8	15 25.0	– 5 34.4	–0.7735	0.6025	0.0214	–25	–90
B. Ophiuchi	6.2	0.34	2.4	26 24.2	17 55.2	– 3 10.5	+0.7274	0.6038	0.0138	+64	+ 1
B. Ophiuchi	6.3	+0.32	–2.6	–25 9.3	19 56.1	– 1 14.5	–0.5461	0.6047	–0.0076	–14	–80
Ophi. (*1st star*)	5.4	0.31	2.4	26 29.0	21 5.7	– 0 7.8	+0.7780	0.6052	–0.0041	+64	+ 4
Ophiuchi	3.4	0.29	2.7	24 55.1	23 34.6	+ 2 14.8	–0.7882	0.6062	+0.0035	–27	–90
G. Ophiuchi	6.3	0.28	2.5	25 52.3	20 1 23.1	+ 3 58.7	+0.1761	0.6069	0.0091	+25	–31
G. Ophiuchi	6.0	0.26	2.4	26 12.5	3 9.8	+ 5 40.9	+0.5325	0.6075	0.0147	+47	–11
Ophiuchi	6.1	+0.20	–2.6	–24 52.3	11 43.5	–10 7.2	–0.5570	0.6095	+0.0414	–11	–81
Sagittarii	5.5	0.18	2.7	24 17.0	14 39.4	– 7 18.9	–1.0057	0.6099	0.0505	–38	–90
Sagittarii	6.0	0.18	–2.7	24 21.9	15 1.8	– 6 57.3	–0.9062	0.6099	0.0517	–31	–90
				NEW	*MOON.*						
Aquarii	5.3	+0.18	+0.1	– 8 14.3	24 20 2.6	– 5 57.0	+1.3338	0.5593	+0.2586	+81	+44
3. Aquarii	6.0	0.19	0.2	7 36.9	21 30.7	– 4 32.1	+1.0994	0.5585	0.2594	+82	+20
Aquarii	5.8	0.18	0.7	5 15.4	21 46.7	– 4 16.6	–1.1554	0.5583	0.2595	–26	–90
3. Aquarii	6.1	0.21	0.5	6 58.7	25 0 55.8	– 1 14.1	+1.3641	0.5566	0.2609	+78	+49
Aquarii	5.2	0.22	1.0	4 39.4	3 48.5	+ 1 32.5	–0.1774	0.5551	0.2620	+32	–51
3. Aquarii	6.3	+0.22	+1.2	– 3 59.1	5 9.7	+ 2 50.9	–0.4857	0.5544	+0.2624	+16	–71
;. Piscium	6.2	+0.28	1.8	2 50.4	12 59.1	+10 24.1	+0.4378	0.5508	0.2638	+67	–19
3. Piscium	6.4	0.36	2.9	– 0 9.8	26 0 27.6	– 2 30.8	+0.8016	0.5465	0.2628	+90	+ 1
Piscium	4.9	0.37	3.2	+ 0 48.1	2 1.1	– 1 0.5	+0.2459	0.5460	0.2625	+55	–29
Piscium	6.4	0.37	3.2	0 40.0	2 9.8	– 0 52.0	+0.4186	0.5460	0.2624	+66	–20
Piscium	5.7	+0.40	+3.6	+ 1 38.6	6 21.9	+ 3 11.5	+0.5434	0.5447	+0.2611	+75	–13
Piscium	5.4	0.44	4.1	3 1.6	10 58.3	+ 7 38.7	+0.3524	0.5435	0.2590	+62	–23
Piscium	6.2	0.57	6.0	7 46.9	27 0 57.0	– 2 50.3	–0.8862	0.5412	0.2501	– 6	–82
Piscium	5.4	0.59	6.0	7 43.9	2 49.4	– 1 1.6	–0.3690	0.5410	0.2486	+22	–61
3. Piscium	6.5	0.69	6.7	8 54.2	12 21.7	+ 8 14.6	+0.7796	0.5405	0.2397	+90	+ 2
Piscium	5.7	+0.72	+7.6	+11 31.4	15 6.5	+10 51.1	–1.2581	0.5404	+0.2368	–35	–78
Piscium	6.3	0.82	8.1	12 30.8	28 0 11.4	– 4 22.1	–0.1754	0.5408	0.2263	+32	–47
Piscium	3.7	0.97	9.0	14 55.3	11 43.7	+ 6 47.2	–0.1429	0.5419	0.2107	+34	–43
Piscium	6.2	1.00	8.8	14 14.4	13 43.0	+ 8 42.6	+0.9810	0.5422	0.2078	+90	+19
Piscium	6.1	1.02	9.5	15 59.3	15 30.3	+10 26.3	–0.4678	0.5424	0.2051	+16	–61
Arietis	*6.4*	*+1.06*	*+9.8*	*+17 0.0*	18 40.9	–10 29.4	–0.8802	0.5429	+0.2002	– 7	–7

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JANUARY.

The Star's Name.	Mag.	Red'ns from 1917.0. Δα	Δδ	Apparent Declination.	At Conjunction in R. A. Greenwich Mean Time.				ψ'
		s	″	° ′	d h m				
4 Arietis	5.8	+1.08	+ 9.6	+16 32.7	26 19 25.1				+0.1991
ε Arietis	5.1	1.13	9.9	17 24.9	23 37.6				0.1922
35 B. Arietis	6.4	1.18	[illegible]	17 51.5	29 2 32.5				0.1874
47 B. Arietis	6.5	1.20	9.9	17 38.2	4 24.0				0.1848
20 H^{1}. Arietis	6.4	1.21	9.5	16 50.3	5 8.4				0.1829
15 Arietis	5.9	+1.22	+10.4	+19 6.7	5 41.4				+0.1830
θ Arietis	5.6	[illegible]	10.5	[illegible]	9 6.9				0.1760
26 Arietis	6.2	1.36	10.3	19 29.4	14 48.2				0.1656
μ Arietis	5.7	1.44	10.2	19 39.7	20 7.1				0.1555
47 Arietis	5.8	[illegible]	[illegible]	20 20.4	30 3 11.6				0.1416
ε Arietis (mean)	4.6	+1.56	+10.4	+21 0.7	3 42.2				+0.1404
60 Arietis	6.1	1.77	10.2	22 31.3	16 46.6				0.1130
7 Tauri	5.9	[illegible]	[illegible]	24 11 4	19 25.8				0.1072
16 Tauri	5.4	1.89	10.2	24 1.9	31 0 2.5				0.0970
17 Tauri	[illegible]	1.89	[illegible]	23 51.4	0 4.5				0.0970
18 Tauri	5.6	+1.90	+10.4	+24 35.0	0 11.6				+0.0967
q Tauri	4.3	1.90	[illegible]	24 12.6	0 13.1				0.0966
20 Tauri	4.1	1.90	10.2	24 6.7	0 29.7				0.0960
21 Tauri	5.8	1.90	[illegible]	24 18.0	0 31.7				0.0960
22 Tauri	6.5	1.90	10.2	24 16.4	0 35.4				0.0959
23 Tauri	4.3	+1.90	+10.0	+23 41.6	0 43.4				+0.0955
η Tauri	3.0	1 91	10.1	23 51.1	1 14.1				0.0944
104 B. Tauri	5.5	1.91	9.8	23 10.2	1 37.7				0.0935
27 Tauri	3.7	1 92	10.0	23 48.2	1 58.9				0.0927
28 Tauri	5 2	1 92	10.0	23 53.2	1 59.5				0.0927
36 Tauri	5 6	+2 02	+ 9.4	+23 52.9	8 43.5				+0.0774
χ Tauri	5.3	2.16	9.2	25 26.2	16 46.4				0.0589
62 Tauri	6.1	+2.15	+ 8.7	+24 6.7	17 25.2				+0.0574

FEBRUARY.

Name.	Mag.	Δα	Δδ	Apparent Declination.	Greenwich Mean Time.				ψ'
315 B. Tauri	6.3	+2.35	+ 7.3	+24 27.8	1 7 42.6	− 0 22.8	+1.2161		
k Tauri	5.6	2 37	7.3	24 55.5	8 32.5	+ 0 25.3	+0 7305		
118 Tauri	5.4	2.54	5.6	25 5 2	22 23.8	−10 12.2	+0.6355		
125 Tauri	5.1	2.61	5.2	25 51.2	2 3 4.1	− 5 41.6	−0.2812		
132 Tauri	5.0	+2.63	+ 4.3	+24 32.5	7 15.9	− 1 38.5	+1.0496		
412 B. Tauri	5.8	2.66	3.7	24 14.4	10 50.7	+ 1 49.0	+1.2573		
139 Tauri	4.7	2.70	4.1	25 56.7	11 17.7	+ 2 15.1	−0.6386		
5 Geminorum	5.9	2.73	2.8	24 26.4	17 28.3	+ 8 13.1	+0.7284		
8 Geminorum	6.1	2.74	2.4	23 59.9	19 39.6	+10 19 9	+1.0925		
52 B. Geminorum	6.5	+2.84	+ 1.1	+24 39.7	3 5 22.2	− 4 16.9	−0 3127		
ε Geminorum	3.2	2.87	+ 0.8	25 12.9	8 22.0	− 1 23.1	−1.1739		
87 B. Geminorum	5.8	2.86	− 0.1	23 42.0	12 9.6	+ 2 17.0	+0.1593		
ω Geminorum	5.2	2.91	0.7	24 20 0	17 2.4	+ 7 0.2	−1.0249		
[illegible] Geminorum	5.9	2.88	1.2	22 45 7	18 25.9	+ 8 20.9	+0.5705		
δ Geminorum	3.5	+2.91	− 2.4	+22 8 1	4 1 29.6	− 8 49.1	+0.4668	0.5350	−0.119
58 Geminorum	6.0	2.94	2.5	23 6.3	3 4.8	− 7 16.9	−0.8014	0.5349	0.122
149 B. Geminorum	6.4	2.92	2 9	21 42 1	4 44.2	− 5 40 7	+0.5496	0.5341	0.125
[illegible] Geminorum	5.3	2.92	3.0	21 36 9	5 9.6	− 5 16.2	+0.5921	0 5339	0.126
79 Geminorum	6.3	2.93	4.4	20 30.9	13 37.9	+ 2 56.1	+0.8776	0 5300	0.141
209 B. Geminorum	6 2	+2.92	− 5.0	+19 32.2	16 58.9	+ 6 10.8	+1.2803	0.5284	−0.1

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

FEBRUARY.

The Star's Name.	Mag.	Red'ns from 1917.0. Δα	Δδ	Apparent Declination.	At Conjunction in R. A. Greenwich Mean Time.	Hour Angle, H	Y	x′	y′	Limiting Parallels. N.	S.
		s	″	° ′	d h m	h m				°	°
Saturn	0.0	. . .	. . .	+21 15.0	4 18 45.7	+ 7 54.3	−0.8872	0.5311	−0.1508	− 9	−69
Geminorum	5.2	+2.94	− 5.2	20 6.2	18 48.3	+ 7 56.8	+0.3814	0.5276	0.1501	+65	−10
B. Geminorum	6.3	2.94	5.5	20 2.6	21 20.9	+10 24.7	+0.0606	0.5264	0.1542	+45	−27
H. Cancri	6.1	2.93	5.9	19 4.5	23 19.9	−11 40.0	+0.8267	0.5254	0.1573	+90	+14
Cancri	5.9	2.94	7.2	18 35.9	5 8 41.4	− 2 35.5	−0.1801	0.5211	0.1712	+32	−42
Cancri	6.2	+2.92	− 7.5	+17 19.1	9 58.1	− 1 21.2	+1.0220	0.5205	−0.1730	+90	+25
Neptune	7.7	. . .	. . .	19 14.2	10 9.0	− 1 10.6	−1.1427	0.5217	0.1736	−28	−71
Cancri	5.5	2.94	7.8	18 22.4	12 53.0	+ 1 28.5	−0.6611	0.5192	0.1770	+ 5	−70
Cancri	6.3	2.90	9.2	15 39.4	22 56.0	+11 13.6	+0.5145	0.5147	0.1899	+75	− 8
Cancri	5.1	2.90	9.6	15 38.4	6 2 10.1	− 9 38.0	−0.0865	0.5134	0.1937	+37	−39
Cancri	5.7	+2.90	− 9.6	+15 53.9	2 20.5	− 9 27.9	−0.4080	0.5133	−0.1939	+20	−58
Cancri	6.4	2.89	10.5	15 19.7	10 6.8	− 1 55.1	−1.3149	0.5102	0.2024	−45	−75
Leonis	5.1	2.82	11.6	11 39.9	20 36.6	+ 8 16.7	+0.5783	0.5064	0.2125	+79	− 7
Leonis	3.8	2.79	12.1	10 16.0	7 1 35.1	−10 53.3	+1.0631	0.5048	0.2166	+90	+21
B. Leonis	5.9	2.77	12.8	9 19.4	9 53.2	− 2 49.2	+0.2860	0.5024	0.2228	+58	−24
B. Leonis	6.2	+2.76	−12.8	+ 8 42.4	10 48.7	− 1 55.2	+0.7636	0.5022	−0.2234	+90	+ 1
Leonis	4.9	2.75	12.9	8 26.4	11 57.3	− 0 48.5	+0.8047	0.5019	0.2242	+90	+ 3
Leonis	6.3	2.70	13.8	6 57.6	8 0 28.9	+11 22.4	−0.4107	0.4994	0.2312	+20	−64
B. Leonis	6.5	2.69	13.7	6 6.7	0 37.8	+11 31.0	+0.4957	0.4994	0.2313	+72	−15
Sextantis	6.1	2.64	14.4	5 10.8	11 44.5	− 1 40.6	−1.0676	0.4980	0.2356	−18	−85
Leonis	5.7	+2.57	−14.8	+ 2 24.1	9 0 50.2	+11 3.6	−1.1034	0.4976	−0.2385	−21	−88
Leonis	5.3	2.54	14.6	0 22.7	4 37.6	− 9 15.2	+0.2251	0.4978	0.2388	+54	−30
B. Leonis	6.3	2.52	14.9	+ 0 35.0	9 54.2	− 4 7.3	−1.2616	0.4982	0.2390	−34	−89
B. Leonis	6.3	2.50	14.7	− 1 14.8	12 26.7	− 1 39.0	+0.1464	0.4984	0.2389	+49	−34
Leonis	5.1	2.49	14.5	2 33.0	13 46.8	− 0 21.0	+1.2601	0.4986	0.2389	+87	+34
B. Leonis	6.2	+2.47	−14.8	− 1 58.9	18 14.0	+ 3 58.8	−0.4278	0.4993	−0.2384	+19	−67
B. Virginis	5.9	2.42	14.4	4 52.5	10 1 9.6	+10 43.0	+1.1016	0.5006	0.2372	+85	+20
B. Virginis	6.5	2.36	14.0	7 19.0	11 42.0	− 3 2.3	+1.2860	0.5035	0.2340	+83	+38
Virginis	5.3	2.29	13.7	8 59.9	11 0 9.7	+ 9 4.1	+0.2367	0.5081	0.2280	+52	−29
B. Virginis	6.0	2.22	13.1	11 12.1	10 54.4	− 4 29.9	+0.2188	0.5131	0.2208	+50	−30
Virginis	4.9	+2.12	−11.6	−15 32.8	12 3 43.2	+11 48.6	+1.3174	0.5228	−0.2056	+74	+46
Virginis	5.6	2.09	11.8	14 56.4	6 24.4	− 9 35.1	+0.1149	0.5245	0.2027	+41	−35
Virginis	5.6	2.05	11.4	15 45.9	12 6.5	− 4 3.6	−0.1350	0.5284	0.1960	+28	−49
Virginis	6.1	2.05	11.5	15 21.2	12 38.6	− 3 32.5	−0.6807	0.5288	0.1954	− 1	−90
H. Virginis	5.5	1.94	10.3	17 49.0	13 2 50.5	+10 11.9	−0.6847	0.5392	0.1760	− 4	−90
G. Virginis	6.4	+1.94	−10.1	−18 12.2	3 36.7	+10 56.6	−0.4085	0.5398	−0.1748	+11	−67
G. Virginis	5.7	1.93	10.1	18 20.1	4 20.8	+11 39.2	−0.3962	0.5404	0.1737	+11	−66
G. Libræ	6.5	1.87	9.2	20 4.7	11 47.1	− 5 9.4	+0.2083	0.5463	0.1617	+41	−30
G. Libræ	6.4	1.83	8.7	20 49.6	16 54.0	− 0 12.9	+0.1964	0.5504	0.1527	+40	−31
G. Libræ	6.1	1.83	8.6	20 58.8	17 21.8	+ 0 14.0	+0.2869	0.5508	0.1519	+45	−26
B. Libræ	5.7	+1.79	− 8.6	−21 2.7	21 52.2	+ 4 35.0	−0.3100	0.5545	−0.1435	+12	−60
G. Libræ	6.1	1.75	8.0	21 42.7	14 1 51.0	+ 8 25.3	−0.1628	0.5578	0.1357	+19	−51
G. Libræ	5.8	1.71	7.6	22 5.7	6 9.4	−11 25.5	−0.3252	0.5612	0.1269	+ 9	−61
B. Libræ	6.3	1.65	6.5	24 12.6	13 17.0	− 4 33.4	+1.0374	0.5669	0.1115	+66	+22
B. Libræ	6.0	1.62	6.9	22 52.1	15 15.6	− 2 39.1	−0.5791	0.5685	0.1070	− 6	−82
B. Libræ	6.2	+1.61	− 6.8	−22 52.9	15 54.7	− 2 1.5	−0.6352	0.5690	−0.1055	− 9	−89
Libræ	5.0	1.62	6.6	23 33.1	16 17.4	− 1 39.6	+0.0234	0.5693	0.1046	+25	−40
Scorpii	4.6	1.57	5.7	25 4.9	21 48.8	+ 3 39.4	+1.0726	0.5736	0.0917	+65	+25
B. Scorpii	5.4	1.56	6.0	24 17.3	21 56.5	+ 3 46.8	+0.2365	0.5737	0.0914	+35	−28
B. *Scorpii*	*5.3*	*1.56*	*6.2*	23 44.0	21 57.8	+ 3 48.0	−0.3425	0.5737	0.0913	+ 5	−63
Scorpii	*5.9*	*+1.56*	*− 5.7*	−25 0.0	22 14.7	+ 4 4.4	+0.9482	0.5739	−0.0906	+65	[illegible]

ELEMENTS FOR THE PREDICTION OF OCCULTATION

FEBRUARY.

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

FEBRUARY.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1917.0. Δα	Δδ	Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		s	"	° '	d h m	h m				°	°
Arietis	6.4	+0.72	+7.6	+17 0.0	25 3 21.7	− 0 0.7	−1.0244	0.5533	+0.2033	−17	−73
Arietis	5.8	0.73	7.4	16 32.7	4 4.4	+ 0 40.5	−0.4133	0.5534	0.2021	+19	−57
Arietis	5.1	0.78	7.8	17 24.9	8 8.5	+ 4 36.1	−0.5012	0.5540	0.1952	+14	−62
Arietis	6.4	0.81	7.9	17 51.4	10 57.6	+ 7 19.3	−0.4148	0.5543	0.1903	+19	−56
Arietis	6.5	0.83	7.9	17 38.2	12 45.4	+ 9 3.4	+0.1516	0.5546	0.1870	+50	−25
P. Arietis	6.4	+0.84	+7.6	+16 50.3	13 28.5	+ 9 45.0	+1.1116	0.5547	+0.1857	+90	+31
Arietis	5.9	0.85	8.3	19 6.7	14 0.4	+10 15.8	−1.1411	0.5548	0.1847	−28	−71
Arietis	5.6	0.89	8.4	19 31.2	17 19.2	−10 32.4	−0.9646	0.5552	0.1786	−14	−70
Arietis	6.2	0.96	8.4	19 29.4	22 49.9	− 5 13.2	+0.0202	0.5560	0.1680	+42	−30
Arietis	5.7	1.03	8.5	19 39.7	26 3 59.2	− 0 14.8	+0.6825	0.5566	0.1577	+90	+ 6
Arietis	5.8	+1.13	+8.5	+20 20.3	10 51.5	+ 6 22.9	+1.0112	0.5575	+0.1433	+90	+29
Arietis (*mean*)	4.6	1.14	8.8	21 0.7	11 21.2	+ 6 51.6	+0.3766	0.5575	0.1423	+65	− 8
Arietis	6.1	1.33	8.8	22 31.3	27 0 5.2	− 4 51.4	+0.4246	0.5586	0.1143	+69	− 3
Tauri	5.9	1.38	9.3	24 11.4	2 40.6	− 2 21.5	−1.0547	0.5588	0.1085	−23	−66
Tauri	5.4	1.45	9.1	24 1.9	7 11.0	+ 1 59.3	−0.4237	0.5590	0.0981	+18	−47
Tauri	3.8	+1.45	+9.0	+23 51.3	7 13.0	+ 2 1.2	−0.2333	0.5590	+0.0981	+28	−36
Tauri	5.6	1.45	9.2	24 34.9	7 19.9	+ 2 7.9	−0.9947	0.5590	0.0978	−19	−65
Tauri	4.3	1.45	9.1	24 12.6	7 21.4	+ 2 9.3	−0.5968	0.5590	0.0977	+ 8	−59
Tauri	4.1	1.45	9.1	24 6.7	7 37.6	+ 2 25.0	−0.4657	0.5590	0.0971	+15	−50
Tauri	5.8	1.46	9.1	24 17.9	7 39.6	+ 2 26.9	−0.6614	0.5590	0.0970	+ 4	−63
Tauri	6.5	+1.46	+9.1	+24 16.3	7 43.3	+ 2 30.5	−0.6274	0.5590	+0.0969	+ 6	−61
Tauri	4.3	1.46	8.9	23 41.6	7 51.0	+ 2 37.9	+0.0012	0.5590	0.0966	+41	−23
Tauri	3.0	1.46	8.9	23 51.1	8 21.1	+ 3 6.9	−0.1195	0.5590	0.0954	+35	−30
B. Tauri	5.5	1.46	8.7	23 10.2	8 44.1	+ 3 29.0	+0.6431	0.5591	0.0945	+90	+11
Tauri	3.7	1.47	8.9	23 48.2	9 4.9	+ 3 49.2	+0.0014	0.5591	0.0937	+42	−23
Tauri	5.2	+1.47	+8.9	+23 53.2	9 5.4	+ 3 49.6	−0.0866	0.5591	+0.0937	+36	−28
Tauri	6.0	1.52	8.4	22 56.3	12 31.8	+ 7 8.7	+1.2339	0.5591	0.0857	+84	+55
Tauri	5.6	1.58	8.5	23 52.8	15 41.3	+10 11.5	+0.4879	0.5591	0.0783	+74	+ 4
Tauri	5.3	1.72	8.5	25 26.2	23 35.3	− 6 11.4	−0.6347	0.5587	0.0595	+ 5	−58
Tauri	6.1	1.71	8.0	24 6.6	28 0 13.5	− 5 34.6	+0.8266	0.5587	0.0580	+90	+25
B. Tauri	6.3	+1.93	+6.9	+24 27.7	14 18.5	+ 8 0.6	+1.0343	0.5570	+0.0243	+90	+42
Tauri	5.6	+1.95	+7.0	+24 55.5	15 7.8	+ 8 48.1	+0.5532	0.5568	+0.0224	+81	+13

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Tauri	5.4	+2.15	+5.7	+25 5.2	1 4 50.7	− 1 57.8	+0.4652	0.5539	−0.0101	+73	+ 9
Tauri	5.1	2.22	5.4	25 51.2	9 29.0	+ 2 30.9	−0.4434	0.5526	0.0209	+16	−42
Tauri	5.0	2.26	4.5	24 32.5	13 39.2	+ 6 32.3	+0.8818	0.5513	0.0305	+90	+31
B. Tauri	5.8	2.30	4.0	24 14.4	17 12.9	+ 9 58.7	+1.0909	0.5502	0.0386	+90	+45
Tauri	4.7	2.34	4.5	25 56.8	17 39.7	+10 24.6	−0.7947	0.5500	0.0396	− 5	−64
Geminorum	5.9	+2.39	+3.2	+24 26.4	23 48.7	− 7 39.0	+0.5693	0.5478	−0.0533	+82	+10
Geminorum	6.1	2.41	2.8	23 59.9	2 1 59.6	− 5 32.6	+0.9333	0.5470	0.0581	+90	+32
Geminorum	6.2	2.41	2.7	23 46.2	2 17.9	− 5 14.9	+1.1658	0.5469	0.0588	+90	+50
B. Geminorum	6.5	2.54	1.7	24 39.7	11 41.0	+ 3 49.3	−0.4590	0.5432	0.0788	+16	−48
B. Geminorum	5.8	2.59	+0.5	23 42.1	18 28.2	+10 23.0	+0.0169	0.5402	0.0927	+42	−23
Geminorum	5.2	+2.65	0.0	+24 20.1	23 21.0	− 8 53.8	−1.1599	0.5380	−0.1024	−34	−66
Geminorum	5.9	2.64	−0.6	22 45.8	3 0 44.7	− 7 32.8	+0.4325	0.5374	0.1051	+70	− 2
Geminorum	3.5	2.69	1.8	22 8.1	7 48.7	− 0 42.4	+0.3361	0.5343	0.1184	+62	− 9
Geminorum	6.0	2.72	1.8	23 6.3	9 24.1	+ 0 49.9	−0.9278	0.5334	0.1213	−13	−67
B. Geminorum	6.4	2.71	2.4	21 42.1	11 3.6	+ 2 26.2	+0.4221	0.5326	0.1244	+68	− 5
Geminorum	*5.3*	*+2.72*	*−2.4*	*+21 36.9*	11 29.1	+ 2 50.9	+0.4649	0.5324	−0.1251	+72	− 3

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MARCH.

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MARCH.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1917.0. Δα	Δδ	Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Y	x′	y′	N.	S.
		s	″	° ′	d h m	h m				°	°
B. Scorpii	6.4	+2.42	−8.4	−24 30.0	14 7 58.9	− 8 32.7	+0.3325	0.5723	−0.0803	+40	−23
B. Scorpii	5.7	2.39	8.6	23 23.0	8 54.6	− 7 39.0	−0.9104	0.5729	0.0780	−29	−90
B. Scorpii	6.2	2.40	8.3	24 14.6	9 37.7	− 6 57.5	−0.0659	0.5732	0.0763	+18	−45
B. Scorpii	5.8	2.38	8.5	23 28.0	9 59.9	− 6 36.2	−0.9057	0.5735	0.0754	−28	−90
B. Scorpii	6.3	2.38	8.0	24 12.8	12 4.1	− 4 36.6	−0.2761	0.5746	0.0703	+ 7	−58
B. Scorpii	6.0	+2.39	−7.6	−25 16.1	12 31.2	− 4 10.5	+0.7956	0.5749	−0.0691	+65	+ 5
Scorpii	4.9	2.34	7.8	23 58.3	14 54.2	− 1 53.0	−0.7160	0.5761	0.0632	−18	−90
Scorpii	3.1	2.36	7.3	25 23.8	15 6.6	− 1 41.0	+0.7571	0.5762	0.0627	+65	+ 3
Scorpii	4.8	2.32	7.0	24 56.1	18 48.5	+ 1 52.5	+0.0611	0.5781	0.0532	+22	−38
B. Scorpii	6.1	2.26	6.7	24 18.6	23 27.1	+ 6 20.5	−0.8078	0.5803	0.0411	−26	−90
B. Ophiuchi	6.3	+2.19	−5.6	−24 58.1	15 6 50.1	−10 33.6	−0.3534	0.5832	−0.0214	− 2	−64
Ophiuchi	5.8	2.18	5.7	24 51.9	6 54.7	−10 29.2	−0.4625	0.5833	0.0212	− 8	−72
B. Ophiuchi	6.2	2.18	4.8	26 24.2	9 35.0	− 7 55.1	+1.0820	0.5842	0.0139	+64	+28
B. Ophiuchi	6.3	2.14	5.0	25 9.3	11 44.2	− 5 51.0	−0.2324	0.5849	0.0081	+ 3	−55
Oph. (*1st star*)	5.4	2.14	4.6	26 29.0	12 58.6	− 4 39.6	+1.1315	0.5852	0.0047	+64	+33
Ophiuchi	5.1	+2.09	−5.1	−24 11.9	14 3.2	− 3 37.4	−1.2300	0.5856	−0.0017	−61	−83
Ophiuchi	3.4	2.08	4.6	24 55.1	15 37.8	− 2 6.4	−0.4858	0.5860	+0.0026	−11	−74
B. Ophiuchi	6.3	2.06	4.8	24 10.2	16 52.1	− 0 55.1	−1.2521	0.5863	0.0061	−63	−77
G. Ophiuchi	6.3	2.08	4.1	25 52.3	17 33.9	− 0 14.9	+0.5066	0.5865	0.0080	+45	−12
G. Ophiuhci	6.0	2.06	3.7	26 12.5	19 28.1	+ 1 34.8	+0.8721	0.5869	0.0132	+64	+11
Ophiuchi	6.1	+1.92	−3.2	−24 52.4	16 4 38.2	+10 23.2	−0.2622	0.5884	+0.0388	+ 4	−57
Sagittarii	4.8	1.88	3.3	23 48.6	6 34.8	−11 44.9	−1.2687	0.5885	0.0442	−64	−73
Sagittarii	5.5	1.88	3.0	24 17.0	7 46.6	−10 35.9	−0.7293	0.5886	0.0475	−20	−90
Sagittarii	6.0	1.87	3.0	24 21.9	8 10.7	−10 12.8	−0.6271	0.5887	0.0486	−14	−89
Sagittarii	5.2	1.82	2.8	23 43.2	11 16.7	− 7 14.1	−1.1204	0.5888	0.0572	−46	−90
B. Sagittarii	6.4	+1.82	−1.9	−25 38.2	13 59.6	− 4 37.7	+1.0026	0.5888	+0.0647	+64	+20
B. Sagittarii	6.4	1.79	2.0	24 57.2	15 7.1	− 3 32.8	+0.3799	0.5887	0.0678	+42	−20
Sagittarii	2.9	1.76	1.5	25 28.2	17 39.2	− 1 6.9	+1.0845	0.5887	0.0747	+65	+27
Sagittarii	5.7	1.72	1.7	24 5.7	20 0.3	+ 1 8.7	−0.1306	0.5885	0.0811	+15	−49
B. Sagittarii	5.8	1.69	1.7	23 34.6	21 50.1	+ 2 54.2	−0.5048	0.5883	0.0861	− 4	−74
Sagittarii	6.1	+1.67	−1.5	−23 54.7	23 9.0	+ 4 10.0	−0.0487	0.5882	+0.0896	+20	−44
B. Sagittarii	5.7	1.67	0.9	25 5.7	17 0 18.3	+ 5 16.5	+1.2583	0.5881	0.0927	+65	+50
Sagittarii	5.0	1.60	1.3	22 50.9	4 2.0	+ 8 51.5	−0.6579	0.5876	0.1026	−11	−90
Sagittarii	5.1	1.59	1.3	22 46.6	4 24.3	+ 9 12.9	−0.6924	0.5874	0.1036	−13	−90
B. Sagittarii	5.9	1.59	1.1	23 16.8	4 45.3	+ 9 33.1	−0.1447	0.5874	0.1045	+16	−50
B. Sagittarii	6.3	+1.56	−1.0	−22 48.8	6 59.3	+11 41.7	−0.3778	0.5870	+0.1103	+ 5	−65
Sagittarii	3.9	1.53	1.2	21 51.9	8 12.7	−11 7.7	−1.2010	0.5868	0.1135	−49	−90
B. Sagittarii	6.5	1.53	0.6	23 19.3	9 48.3	− 9 35.9	+0.4580	0.5864	0.1176	+51	−16
B. Sagittarii	6.4	1.49	1.0	21 47.8	11 18.4	− 8 9.1	−0.9036	0.5861	0.1214	−24	−90
B. Sagittarii	5.5	1.46	0.4	22 33.5	14 33.2	− 5 2.1	+0.2723	0.5852	0.1296	+41	−26
Sagittarii	5.5	+1.42	−0.4	−21 56.5	16 49.9	− 2 50.7	−0.0474	0.5847	+0.1352	+24	−44
B. Sagittarii	6.1	1.40	0.4	21 29.2	18 40.5	− 1 4.4	−0.2537	0.5841	0.1397	+14	−56
Sagittarii	5.1	1.30	0.3	19 57.7	18 0 55.2	+ 4 55.8	−0.8666	0.5822	0.1545	−18	−90
Sagittarii	6.0	1.27	−0.3	19 15.4	3 17.1	+ 7 12.1	−1.2019	0.5814	0.1599	−44	−90
Capricorni	5.5	1.14	+0.7	19 22.7	14 22.4	− 6 7.9	+0.8277	0.5774	0.1836	+71	+ 5
Capricorni	5.2	+1.10	+0.7	−18 29.1	17 39.0	− 2 58.8	+0.5462	0.5761	+0.1902	+63	−12
Capricorni	5.0	1.09	0.6	18 5.3	18 17.5	− 2 21.7	+0.2735	0.5758	0.1914	+47	−26
Capricorni	5.6	1.09	0.9	18 51.5	18 42.6	− 1 57.6	+1.1221	0.5757	0.1922	+71	+26
B. Capricorni	6.2	1.05	0.5	16 48.7	21 4.0	+ 0 18.5	−0.4621	0.5748	0.1967	+ 9	−70
B. Capricorni	5.9	1.02	0.6	16 25.2	23 9.4	+ 2 19.3	−0.4372	0.5739	0.2005	+10	−69
B. Capricorni	*5.7*	*+0.95*	*+1.0*	*−16 21.1*	19 6 19.3	+ 9 13.1	+0.9756	0.5711	+0.2129	+74	+14

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS

MARCH.

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MARCH.

The Star's Name.	Mag.	Red'ns from 1917.0. Δα	Δδ	Apparent Declination.	At Conjunction in R. A. Greenwich Mean Time.	Hour Angle, H	Y	x′	y′	Limiting Parallels. N.	S.
		s	″	° ′	d h m	h m				°	°
Geminorum	6.2	+1.92	+ 2.7	+23 46.2	29 9 49.4	+ 4 4.4	+0.8833	0.5508	-0.0589	+90	+28
B. Geminorum	6.0	1.96	2.1	23 22.5	13 41.9	+ 7 49.0	+1.0716	0.5489	0.0674	+90	+41
B. Geminorum	6.5	2.05	2.0	24 39.7	19 5.8	-10 58.2	-0.7277	0.5462	0.0788	- 1	-65
B. Geminorum	5.8	2.12	+ 0.9	23 42.1	30 1 48.8	- 4 28.7	-0.2538	0.5426	0.0926	+27	-37
Geminorum	5.9	2.18	- 0.1	22 45.8	8 2.1	+ 1 32.3	+0.1615	0.5393	0.1048	+51	-16
Geminorum	3.5	+2.25	- 1.1	+22 8.2	15 3.2	+ 8 19.7	+0.0689	0.5355	0.1179	+45	-22
Geminorum	6.0	2.28	1.0	23 6.3	16 38.0	+ 9 51.4	-1.1873	0.5346	0.1208	-36	-67
B. Geminorum	6.4	2.27	1.7	21 42.1	18 17.0	+11 27.2	+0.1563	0.5338	0.1238	+50	-19
Geminorum	5.3	2.28	1.8	21 36.9	18 42.3	+11 51.7	+0.1992	0.5335	0.1245	+53	-16
Geminorum	6.3	2.35	3.1	20 30.9	31 3 9.1	- 3 57.5	+0.2994	0.5290	0.1390	+59	-13
Saturn	0.3	. . .	. . .	+21 40.6	4 11.1	- 2 57.4	-1.1265	0.5281	-0.1407	-29	-68
B. Geminorum	6.2	+2.37	- 3.9	19 32.2	6 29.9	- 0 43.0	+0.9053	0.5272	0.1444	+90	-20
Geminorum	5.2	2.40	3.9	20 6.2	8 19.2	+ 1 2.9	+0.0151	0.5262	0.1473	+42	-29
B. Geminorum	6.3	2.42	4.2	20 2.6	10 51.6	+ 3 30.6	-0.2987	0.5250	0.1513	+25	-46
H. Cancri	6.1	2.43	4.8	19 4.6	12 50.6	+ 5 25.9	+0.4679	0.5239	0.1543	+71	- 6
Cancri (*mean*)	4.7	+2.44	- 5.6	+17 53.9	16 35.0	+ 9 3.5	+1.1839	0.5221	-0.1599	+90	+40
Cancri	5.9	2.51	6.0	18 35.9	22 12.4	- 9 29.4	-0.5127	0.5193	0.1679	+13	-61
Cancri	6.2	+2.49	- 6.6	+17 19.1	23 29.1	- 8 15.0	+0.6876	0.5188	-0.1696	+90	+ 4

APRIL.

The Star's Name.	Mag.	Δα	Δδ	Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Y	x′	y′	N.	S.
Cancri	5.5	+2.54	- 6.6	+18 22.4	1 2 24.1	- 5 25.3	-0.9814	0.5174	-0.1736	-16	-72
Cancri	6.3	2.58	8.5	15 39.4	12 27.9	+ 4 20.6	+0.2171	0.5130	0.1862	+53	-23
Cancri	5.1	2.61	8.9	15 38.4	15 42.2	+ 7 29.2	-0.3725	0.5118	0.1899	+21	-56
Cancri	5.7	2.61	8.8	15 53.9	15 52.6	+ 7 39.3	-0.6925	0.5117	0.1901	+ 3	-75
Leonis	5.1	+2.68	-12.0	+11 39.9	2 10 8.9	+ 1 24.1	+0.3497	0.5057	-0.2085	+61	-20
Leonis	3.8	2.69	12.8	10 16.0	15 7.0	+ 6 13.7	+0.8505	0.5044	0.2127	+90	+ 7
B. Leonis	5.9	2.73	13.7	9 19.4	23 23.8	- 9 43.5	+0.1064	0.5027	0.2190	+47	-33
B. Leonis	6.2	2.74	14.0	8 42.4	3 0 19.2	- 8 49.5	+0.5860	0.5026	0.2197	+79	- 8
Leonis	4.9	2.74	14.1	8 26.3	1 27.5	- 7 43.2	+0.6313	0.5024	0.2205	+83	- 6
Leonis	6.3	+2.79	-15.5	+ 6 57.6	13 55.2	+ 4 23.8	-0.5304	0.5009	-0.2278	+13	-73
B. Leonis	6.5	2.78	15.7	6 6.7	14 4.0	+ 4 32.3	+0.3731	0.5009	0.2279	+63	-21
Sextantis	6.1	2.83	16.7	5 10.7	4 1 5.4	- 8 44.7	-1.1377	0.5007	0.2326	-24	-85
Leonis	5.7	2.86	17.9	2 24.1	14 2.2	+ 3 50.7	-1.1165	0.5016	0.2360	-22	-88
Leonis	5.3	2.88	18.4	0 22.6	17 46.5	+ 7 28.7	+0.2217	0.5021	0.2365	+53	-30
B. Leonis	6.3	+2.90	-18.6	+ 0 35.0	22 58.6	-11 27.9	-1.2340	0.5030	-0.2369	-32	-89
B. Leonis	6.3	2.90	19.0	- 1 14.9	5 1 28.8	- 9 1.8	+0.1773	0.5036	0.2370	+51	-32
Leonis	5.1	2.90	19.2	2 33.0	2 47.6	- 7 45.1	+1.2906	0.5039	0.2370	+87	+38
B. Leonis	6.2	2.92	19.3	1 58.9	7 10.4	- 3 29.7	-0.3685	0.5049	0.2367	+22	-62
B. Virginis	5.9	2.94	19.8	4 52.6	13 58.6	+ 3 7.0	+1.1818	0.5068	0.2358	+85	+28
B. Virginis	6.5	+2.98	-20.0	- 5 15.8	6 2 19.8	- 8 53.0	-1.2904	0.5114	-0.2321	-40	-90
Virginis	5.3	3.02	20.2	9 0.0	12 31.5	+ 1 0.9	+0.4185	0.5158	0.2272	+64	-19
B. Virginis	6.0	3.06	20.0	11 12.3	23 2.7	+11 13.3	+0.4431	0.5213	0.2201	+64	-18
Virginis	5.6	3.12	19.2	14 56.5	7 18 9.3	+ 5 44.5	+0.4104	0.5327	0.2020	+59	-19
Virginis	5.6	3.14	18.8	15 46.0	23 45.3	+11 9.8	+0.1803	0.5363	0.1953	+44	-31
Virginis	6.1	+3.14	-18.8	-15 21.4	8 0 16.8	+11 40.3	-0.3615	0.5367	-0.1946	+15	-63
H. Virginis	5.5	3.17	17.5	17 49.1	14 15.8	+ 1 11.9	-0.3241	0.5462	0.1749	+15	-60
G. Virginis	6.4	3.18	17.4	18 12.3	15 1.4	+ 1 56.1	-0.0465	0.5467	0.1737	+29	-44
G. Virginis	5.7	3.18	17.4	18 20.2	15 44.9	+ 2 38.1	-0.0322	0.5472	0.1726	+30	-43
G. Libræ	6.5	3.20	16.4	20 4.8	23 6.4	+ 9 44.7	+0.5909	0.5523	0.1603	+65	- 8
G. Libræ	6.4	+3.21	-15.8	-20 49.7	9 4 10.7	- 9 21.5	+0.5918	0.5558	-0.1513	+64	- 8

ELEMENTS FOR THE PREDICTION OF OCCULTATIO

APRIL.

The Star's					At Conjunction in R. A.				
Name.	Mag.	Red'ns from 1917.0. Δα	Δδ	Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Y	x'	
		s	"	° '	d h m	h m			
18 G. Libræ	6.1	+3.21	−15.7	−20 58.9	9 4 38.4	− 8 54.8	+0.6834	0.5561	−0
43 B. Libræ	5.7	3.22	15.7	21 2.8	9 7.2	− 4 35.4	+0.0965	0.5592	0
47 G. Libræ	6.1	3.22	14.6	21 42.8	13 5.2	− 0 45.8	+0.2522	0.5618	0
64 G. Libræ	5.8	3.21	14.0	22 5.8	17 23.3	+ 3 23.2	+0.0978	0.5646	0
169 B. Libræ	6.0	3.20	12.6	22 52.2	10 2 31.0	−11 49.0	−0.1416	0.5701	0
177 B. Libræ	6.2	+3.19	−12.5	−22 53.0	3 10.4	−11 11.0	−0.1970	0.5705	−0
42 Libræ	5.0	3.20	12.3	23 33.2	3 33.2	−10 49.0	+0.4658	0.5707	0
31 B. Scorpii	5.4	3.19	11.3	24 17.4	9 15.0	− 5 19.9	+0.6892	0.5739	0
32 B. Scorpii	5.3	3.18	11.4	23 44.1	9 16.3	− 5 18.6	+0.1063	0.5739	0
40 B. Scorpii	5.4	3.19	10.9	24 35.7	11 11.6	− 3 27.7	+0.8391	0.5749	0
50 B. Scorpii	6.4	+3.18	−10.6	−24 30.1	13 24.3	− 1 19.9	+0.5584	0.5760	−0
57 B. Scorpii	5.7	3.15	10.7	23 23.0	14 19.6	− 0 26.6	−0.6813	0.5765	0
24 G. Scorpii	6.2	3.16	10.4	24 14.6	15 2.4	+ 0 14.6	+0.1626	0.5768	0
27 G. Scorpii	5.8	3.15	10.5	23 28.0	15 24.5	+ 0 35.8	−0.6754	0.5770	0
41 G. Scorpii	6.3	3.15	10.0	24 12.8	17 28.0	+ 2 34.7	−0.0446	0.5780	0
85 B. Scorpii	6.0	+3.17	− 9.7	−25 16.2	17 55.0	+ 3 0.6	+1.0263	0.5782	−0
19 Scorpii	4.9	3.13	9.6	23 58.4	20 17.3	+ 5 17.5	−0.4810	0.5792	0
σ Scorpii	3.1	3.16	9.3	25 23.8	20 29.6	+ 5 29.4	+0.9909	0.5793	0
22 Scorpii	4.8	3.12	8.8	24 56.1	11 0 10.6	+ 9 1.9	+0.2994	0.5808	0
126 B. Scorpii	6.1	3.08	8.2	24 18.6	4 48.4	−10 30.9	−0.5649	0.5825	0
88 B. Ophiuchi	6.3	+3.03	− 6.8	−24 58.1	12 11.1	− 3 25.3	−0.1043	0.5847	−0
26 Ophiuchi	5.8	3.03	6.8	24 51.9	12 15.8	− 3 20.8	−0.2135	0.5847	0
137 B. Ophiuchi	6.3	3.00	5.9	25 9.3	17 5.7	+ 1 17.8	+0.0206	0.5857	0
39 Ophiuchi	5.1	2.95	5.8	24 11.9	19 25.1	+ 3 31.8	−0.9776	0.5861	−0
θ Ophiuchi	3.4	2.95	5.3	24 55.2	21 0.0	+ 5 2.9	−0.2307	0.5863	+0
191 B. Ophiuchi	6.3	+2.92	− 5.3	−24 10.2	22 14.6	+ 6 14.7	−0.9983	0.5865	+0
b Ophiuchi	4.3	2.92	5.3	24 6.1	22 45.0	+ 6 43.9	−1.0651	0.5865	0
136 G. Ophiuchi	6.3	2.96	4.6	25 52.3	22 56.6	+ 6 55.1	+0.7656	0.5866	0
51 Ophiuchi	4.8	2.89	5.0	23 54.0	12 0 45.8	+ 8 40.0	−1.2497	0.5867	0
151 G. Ophiuchi	6.0	2.94	4.2	26 12.5	0 51.4	+ 8 45.4	+1.1336	0.5867	0
63 Ophiuchi	6.1	+2.82	− 3.1	−24 52.4	10 5.4	− 6 22.2	+0.0005	0.5870	+0
4 Sagittarii	4.8	2.77	3.1	23 48.6	12 3.0	− 4 29.3	−1.0099	0.5870	0
7 Sagittarii	5.5	2.77	2.7	24 17.0	13 15.6	− 3 19.5	−0.4675	0.5869	0
9 Sagittarii	6.0	2.76	2.6	24 21.8	13 39.9	− 2 56.2	−0.3647	0.5869	0
1 Sagittarii	5.2	2.72	2.3	23 43.2	16 47.9	+ 0 4.5	−0.8597	0.5866	0
67 B. Sagittarii	6.4	+2.72	− 1.3	−25 38.2	19 32.8	+ 2 42.9	+1.2765	0.5862	+0
70 B. Sagittarii	6.4	2.69	1.3	24 57.2	20 41.2	+ 3 48.6	+0.6504	0.5860	0
24 Sagittarii	5.7	2.61	0.8	24 5.7	13 1 38.4	+ 8 34.2	+0.1380	0.5852	0
117 B. Sagittarii	5.8	2.57	0.6	23 34.6	3 29.9	+10 21.4	−0.2385	0.5848	0
26 Sagittarii	6.1	2.57	0.3	23 54.7	4 50.0	+11 38.4	+0.2211	0.5845	0
28 Sagittarii	5.6	+2.51	− 0.5	−22 28.8	6 39.3	−10 36.6	−1.0770	0.5840	+0
30 Sagittarii	6.2	2.49	− 0.3	22 15.5	8 28.1	− 8 52.0	−1.1291	0.5835	0
ν^1 Sagittarii	5.0	2.48	+ 0.1	22 50.9	9 47.9	− 7 35.3	−0.3926	0.5832	0
ν^2 Sagittarii	5.1	2.48	0.1	22 46.6	10 10.7	− 7 13.3	−0.4274	0.5830	0
154 B. Sagittarii	5.9	2.48	0.4	23 16.8	10 32.1	− 6 52.8	+0.1248	0.5830	0
168 B. Sagittarii	6.3	+2.44	+ 0.5	−22 48.8	12 48.5	− 4 41.7	−0.1104	0.5823	+0
o Sagittarii	3.9	2.41	0.4	21 51.8	14 3.3	− 3 29.7	−0.9409	0.5819	0
191 B. Sagittarii	6.5	2.41	1.1	23 19.3	15 40.8	− 1 56.0	+0.7328	0.5814	0
199 B. Sagittarii	6.4	2.36	0.8	21 47.8	17 12.8	− 0 27.6	−0.6415	0.5808	0
222 B. Sagittarii	5.5	2.33	1.6	22 33.4	20 31.6	+ 2 43.7	+0.5451	0.5796	0
50 Sagittarii	5.5	+2.29	+ 1.7	−21 56.5	22 51.3	+ 4 58.1	+0.2218	0.5788	

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

APRIL.

The Star's Name.	Mag.	Apparent Declination.	At Conjunction in R. A. Greenwich Mean Time.	Hour Angle, H	Y	x′	y′	Limiting Parallels. N.	S.
		° ′	d h m	h m				°	°
B. Sagittarii	6.1	−21 29.1	14 0 44.4	+ 6 46.8	+0.0130	0.5781	+0.1378	+28	−40
Sagittarii	5.1	19 57.7	7 8.0	−11 4.1	−0.6091	0.5755	0.1521	− 3	−84
Sagittarii	6.	19 15.4	9 33.5	− 8 44.0	−0.9495	0.5745	0.1573	−23	−90
Capricorni	5.	19 22.6	20 56.7	+ 2 13.8	+1.0978	0.5695	0.1802	+71	+25
Capricorni	5.	18 29.0	15 0 18.9	+ 5 28.7	+0.8103	0.5680	0.1865	+72	+ 4
Capricorni	5.	−18 5.3	0 58.6	+ 6 6.9	+0.5335	0.5677	+0.1877	+63	−12
B. Capricorni	6.	16 48.6	3 50.0	+ 8 52.0	−0.2145	0.5664	0.1927	+22	−53
B. Capricorni	5.	16 25.1	5 59.2	+10 56.6	−0.1913	0.5655	0.1964	+24	−52
B. Capricorni	5.	16 21.0	13 22.3	− 5 56.3	+1.2334	0.5623	0.2083	+74	+36
B. Capricorni	5.	14 48.2	13 50.1	− 5 29.4	−0.2307	0.5622	0.2090	+23	−54
B. Aquarii	6.	−13 32.7	21 23.6	+ 1 47.9	+0.1228	0.5591	+0.2198	+43	−34
Aquarii	5.	13 14.0	16 0 59.9	+ 5 16.6	+0.6094	0.5577	0.2244	+73	− 8
B. Aquarii	6.	11 55.6	2 47.8	+ 7 0.7	−0.3006	0.5571	0.2268	+22	−58
B. Capricorni	6.	10 57.0	7 47.4	+11 49.9	−0.1378	0.5553	0.2324	+30	−49
Capricorni	5.	9 27.8	10 16.2	− 9 46.5	−1.0534	0.5546	0.2350	−21	−90
Capricorni	6.	− 9 39.5	10 50.0	− 9 13.9	−0.7241	0.5544	+0.2356	0	−90
B. Aquarii	6.	10 42.1	14 6.3	− 6 4.4	+1.1007	0.5534	0.2388	+79	+22
Aquarii	4.	8 11.7	17 0 35.5	+ 4 3.3	+1.1326	0.5507	0.2473	+82	+24
Aquarii	5.	5 48.1	0 44.2	+ 4 11.7	−1.2366	0.5506	0.2474	−34	−90
B. Aquarii	6.	7 36.8	3 38.4	+ 7 0.0	+1.3042	0.5500	0.2492	+83	+41
Aquarii	5.	− 5 15.4	3 54.9	+ 7 15.9	−0.9937	0.5500	+0.2494	−14	−90
Aquarii	5.	4 39.3	10 7.8	−10 43.8	−0.0363	0.5489	0.2527	+39	−43
B. Aquarii	6.	3 59.1	11 31.1	− 9 23.3	−0.3580	0.5488	0.2533	+22	−62
G. Piscium	6.	2 50.3	19 30.3	− 1 40.3	+0.5256	0.5479	0.2558	+74	−13
B. Piscium	6.	− 0 9.8	18 7 5.6	+ 9 31.6	+0.8117	0.5477	0.2567	+90	+ 2
Piscium	4.	+ 0 48.1	8 39.2	+11 2.0	+0.2423	0.5477	+0.2565	+55	−29
Piscium	6.	0 40.1	8 48.0	+11 10.5	+0.4147	0.5477	0.2565	+66	−20
Piscium	5.	1 38.6	12 59.8	− 8 46.2	+0.5108	0.5480	0.2559	+72	−15
Piscium	5.	3 1.6	17 34.5	− 4 20.7	+0.2877	0.5483	0.2546	+57	−28
		NEW	*MOON.*						
Tauri	4.1	+24 6.7	23 2 4.5	+ 0 27.7	−0.8795	0.5733	+0.0967	−11	−66
Tauri	5.	24 17.9	2 6.4	+ 0 29.5	−1.0721	0.5733	0.0966	−26	−66
Tauri	6.	24 16.3	2 9.9	+ 0 33.0	−1.0388	0.5734	0.0965	−23	−66
Tauri	4.	23 41.5	2 17.4	+ 0 40.2	−0.4207	0.5734	0.0962	+17	−47
Tauri	3.	+23 51.1	2 46.3	+ 1 8.0	−0.5409	0.5734	+0.0950	+10	−56
B. Tauri	5.	23 10.1	3 8.5	+ 1 29.4	+0.2081	0.5734	0.0941	+53	−13
Tauri	3.	23 48.1	3 28.4	+ 1 48.6	−0.4239	0.5734	0.0933	+17	−47
Tauri	5.	23 53.1	3 29.0	+ 1 49.1	−0.5104	0.5734	0.0933	+12	−53
Tauri	6.	22 56.2	6 47.4	+ 5 0.1	+0.7790	0.5735	0.0852	+90	+19
B. Tauri	6.	+22 58.2	8 24.8	+ 6 34.0	+0.8809	0.5735	+0.0812	+90	+26
Tauri	5.	23 52.8	9 40.6	+ 7 55.6	+0.0373	0.5735	0.0777	+43	−20
Tauri	5.	25 26.2	17 25.4	− 8 45.4	−1.0847	0.5730	0.0588	−28	−65
Tauri	6.1	24 6.6	18 2.2	− 8 10.0	+0.3497	0.5729	0.0572	+63	− 2
Tauri	6.	23 56.0	24 2 6.3	− 0 23.8	+0.9186	0.5717	0.0369	+90	+33
B. Tauri	6.	+24 27.7	7 35.2	+ 4 52.9	+0.5250	0.5705	+0.0232	+77	+11
Tauri	6.	23 49.3	8 14.9	+ 5 31.3	+1.2214	0.5703	0.0215	+85	+59
Tauri	5.	24 55.5	8 22.6	+ 5 38.7	+0.0507	0.5703	0.0212	+44	−14
Tauri	5.	24 9.5	12 36.1	+ 9 42.9	+0.9355	0.5691	+0.0106	+90	+36
Tauri	5.4	25 5.1	21 36.3	− 5 36.6	−0.0583	0.5660	−0.0116	+30	−19
Tauri	*5.1*	+23 59.2	25 0 16.4	− 3 2.3	+1.0807	0.5649	−0.0180	+90	+4

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS

APRIL.

MAY.

35	Sextantis	6.1	+2.58	−15.7	+ 5 10.8	1	9 5.6	+ 1 3.4	−1.3690	0.4990	−0 23
p^3	Leonis	6.1	2 64	17 7	0 26 5		20 15.9	+11 55.2	+1.2506	0.4999	0.23
p^4	Leonis	5.7	2 66	17.3	2 24.1		22 4.8	−10 18.9	−1.3244	0.5001	0.23
p^5	Leonis	5.3	+2 69	−18 0	+ 0 22 6	2	1 49.7	− 6 40.3	+0.0206	0.5007	−0.23
388 B	Leonis	6.3	2 74	18.8	− 1 14 9		9 32.8	+ 0 50.0	−0.0081	0.5024	0.23
c	Leonis	5.1	2 75	19.1	2 33 0		10 51 8	+ 2 6 8	+1 1072	0.5027	0.23
431 B	Leonis	6 2	2.79	19 1	1 58 9		15 14.9	+ 6 22 5	−0 5413	0.5039	0.23
13 B.	Virginis	5 9	2.83	20 0	4 52.6		22 3.4	−11 0.5	+1.0224	0 5062	0.23
64 B	Virginis	6 5	+2 91	−20.6	− 7 19 1	3	8 23.3	− 0 58.2	+1.2732	0 5103	−0.23
q	Virginis	5.3	3.02	20 9	9 0 0		20 33 8	+10 51.0	+0.3126	0.5104	0.22
370 B	Virginis	6 0	3 10	21 1	11 12 3	4	7 2.0	− 2 59.6	+0 3626	0.5226	0.21
75	Virginis	5.6	3.27	20.6	14 56.5	5	1 59 4	− 8 37.7	+0.3766	0.5354	0.20
83	*Virginis*	5.6	3.32	20 4	15 46.1		7 31.8	− 3 16.0	+0.1613	0.5395	0.1[illegible]
85	*Virginis*	6.1	+3.32	−20.3	−15 21 4		8 3.0	− 2 45.8	−0.3763	0.5399	−0[illegible]

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MAY.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1917.0. Δα	Δδ	Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Y	x′	y′	N.	S.
		s	″	° ′	d h m	h m				°	°
H. Virginis	5.5	+3.44	−19.2	−17 49.2	5 21 51.3	+10 35.1	−0.3055	0.5505	−0.1739	+16	−59
B. Virginis	6.4	3.45	19.2	18 12.3	22 36.8	+11 18.6	−0.0279	0.5510	0.1727	+30	−42
B. Virginis	5.7	3.46	19.1	18 20.2	23 19.2	+12 0.0	−0.0120	0.5516	0.1716	+31	−42
B. Libræ	6.5	3.53	18.4	20 4.8	6 6 34.0	− 5 0.0	+0.6237	0.5572	0.1594	+66	− 5
G. Libræ	6.4	3.57	17.8	20 49.8	11 33.4	− 0 11.1	+0.6357	0.5611	0.1504	+66	− 5
G. Libræ	6.1	+3.57	−17.7	−20 58.9	12 0.7	+ 0 15.2	+0.7277	0.5614	−0.1495	+69	0
B. Libræ	5.7	3.62	17.7	21 2.8	16 25.0	+ 4 30.1	+0.1549	0.5648	0.1410	+36	−32
B. Libræ	6.1	3.63	16.5	21 42.8	20 18.8	+ 8 15.5	+0.3179	0.5676	0.1332	+44	−23
G. Libræ	5.8	3.65	15.8	22 5.8	7 0 32.3	−11 40.2	+0.1737	0.5707	0.1243	+35	−31
B. Libræ	6.0	3.69	14.3	22 52.3	9 29.7	− 3 2.7	−0.0451	0.5767	0.1042	+22	−44
B. Libræ	6.2	+3.70	−14.2	−22 53.0	10 8.4	− 2 25.4	−0.0987	0.5771	−0.1027	+19	−47
Libræ	5.0	3.71	14.0	23 33.2	10 30.8	− 2 3.9	+0.5592	0.5774	0.1018	+56	− 9
B. Scorpii	5.4	3.74	13.0	24 17.4	16 5.9	+ 3 18.5	+0.7917	0.5808	0.0884	+66	+ 5
B. Scorpii	5.3	3.73	13.0	23 44.1	16 7.2	+ 3 19.8	+0.2139	0.5808	0.0884	+34	−29
B. Scorpii	5.4	3.75	12.6	24 35.8	18 0.3	+ 5 8.6	+0.9441	0.5818	0.0838	+65	+16
B. Scorpii	6.4	+3.75	−12.2	−24 30.1	20 10.3	+ 7 13.6	+0.6698	0.5830	−0.0783	+62	− 3
B. Scorpii	5.7	3.72	12.1	23 23.0	21 4.6	+ 8 5.9	−0.5573	0.5835	0.0760	− 8	−80
G. Scorpii	6.2	3.74	11.9	24 14.6	21 46.6	+ 8 46.3	+0.2805	0.5838	0.0743	+36	−25
G. Scorpii	5.8	3.73	11.9	23 28.1	22 8.2	+ 9 7.0	−0.5495	0.5840	0.0734	− 8	−79
G. Scorpii	6.3	3.74	11.4	24 12.8	8 0 9.2	+11 3.4	+0.0796	0.5850	0.0682	+25	−36
B. Scorpii	6.0	+3.77	−11.2	−25 16.2	0 35.7	+11 28.9	+1.1419	0.5853	−0.0671	+65	+34
Scorpii	4.9	3.74	10.9	23 58.4	2 55.2	−10 17.0	−0.3479	0.5863	0.0610	+ 2	−63
Scorpii	3.1	3.78	10.7	25 23.9	3 7.3	−10 5.4	+1.1116	0.5864	0.0605	+65	+30
Ophiuchi	4.7	3.72	10.6	23 15.6	4 54.6	− 8 22.3	−1.2011	0.5872	0.0558	−54	−89
Scorpii	4.8	3.76	10.0	24 56.2	6 44.0	− 6 37.1	+0.4326	0.5881	0.0510	+44	−16
B. Scorpii	6.1	+3.73	− 9.1	−24 18.6	11 16.4	− 2 15.3	−0.4164	0.5897	−0.0388	− 4	−68
B. Ophiuchi	6.3	3.73	7.4	24 58.1	18 30.5	+ 4 41.6	+0.0525	0.5917	0.0191	+19	−38
Ophiuchi	5.8	3.73	7.5	24 51.9	18 35.1	+ 4 46.1	−0.0556	0.5917	0.0188	+13	−44
B. Ophiuchi	6.3	3.72	6.4	25 9.3	23 19.6	+ 9 19.2	+0.1841	0.5927	−0.0056	+25	−30
Ophiuchi	3.4	3.70	5.6	24 55.2	9 3 9.6	−11 0.0	−0.0591	0.5932	+0.0051	+12	−44
B. Ophiuchi	6.3	+3.67	− 5.4	−24 10.2	4 22.8	− 9 49.7	−0.8188	0.5933	+0.0085	−29	−90
Ophiuchi	4.3	3.66	5.4	24 6.1	4 52.7	− 9 21.0	−0.8843	0.5933	0.0099	−33	−90
G. Ophiuchi	6.3	3.71	5.0	25 52.3	5 4.1	− 9 10.0	+0.9322	0.5934	0.0104	+64	+15
Ophiuchi	4.8	3.65	5.0	23 54.1	6 51.3	− 7 27.1	−1.0646	0.5935	0.0155	−45	−90
Ophiuchi	6.1	3.61	2.7	24 52.3	16 1.5	+ 1 21.1	+0.1892	0.5933	0.0410	+29	−30
Sagittarii	4.8	+3.57	− 2.5	−23 48.6	17 57.3	+ 3 12.4	−0.8116	0.5930	+0.0463	−26	−90
Sagittarii	5.5	3.57	2.2	24 17.0	19 8.7	+ 4 20.9	−0.2714	0.5929	0.0496	+ 5	−58
Sagittarii	6.0	3.57	2.1	24 21.8	19 32.6	+ 4 43.9	−0.1688	0.5928	0.0507	+10	−51
Sagittarii	5.2	3.53	1.5	23 43.2	22 37.8	+ 7 41.7	−0.6566	0.5923	0.0592	−15	−90
B. Sagittarii	6.4	3.53	− 0.4	24 57.2	10 2 27.8	+11 22.6	+0.8489	0.5915	0.0696	+65	+ 9
Sagittarii	5.7	+3.46	+ 0.4	−24 5.7	7 21.1	− 7 55.7	+0.3455	0.5902	+0.0826	+41	−21
B. Sagittarii	5.8	3.43	0.7	23 34.6	9 11.2	− 6 9.9	−0.0267	0.5897	0.0874	+21	−42
Sagittarii	6.1	3.42	1.0	23 54.7	10 30.4	− 4 53.9	+0.4319	0.5892	0.0909	+47	−16
Sagittarii	5.6	3.37	1.0	22 28.8	12 18.4	− 3 10.1	−0.8575	0.5886	0.0956	−24	−90
Sagittarii	6.2	3.34	1.3	22 15.5	14 6.0	− 1 26.7	−0.9076	0.5879	0.1002	−26	−90
Sagittarii	5.0	+3.34	+ 1.8	−22 50.9	15 25.0	− 0 10.8	−0.1733	0.5874	+0.1035	+14	−51
Sagittarii	5.1	3.34	1.8	22 46.5	15 47.5	+ 0 10.8	−0.2076	0.5873	0.1045	+13	−53
B. Sagittarii	5.9	3.34	2.0	23 16.8	16 8.6	+ 0 31.2	+0.3425	0.5872	0.1053	+43	−22
B. Sagittarii	6.3	3.31	2.4	22 48.8	18 23.8	+ 2 41.0	+0.1107	0.5862	0.1110	+30	−35
Sagittarii	*3.9*	*3.27*	*2.3*	21 51.8	19 37.8	+ 3 52.1	−0.7152	0.5857	0.1140	−13	−90
Sagittarii	*6.5*	*+3.29*	*+ 3.1*	−23 19.3	21 14.5	+ 5 25.1	+0.9533	0.5850	+0.1179	+67	+16

ELEMENTS FOR THE PREDICTION OF OCCULTATI

MAY.

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MAY.

The Star's	At Conjunction in R. A.		Limiting Parallels.	
Red'n	x'	y'	N.	S.
			°	°
	0.5509	-0.0955	0	-66
	0.5470	0.1076	+23	-42
	0.5457	0.1119	+90	+26
	0.5427	0.1206	+17	-50
	0.5421	0.1222	+90	+42
	0.5406	-0.1263	+22	-46
	0 5405	0.1264	+90	+33
	0.5403	0.1270	+24	-43
	0.5349	0.1412	+29	-40
	0.5328	0.1465	+65	- 9
	0.5316	-0.1494	+14	-58
	0.5300	0.1532	- 5	-70
	0.5288	0.1561	+38	-33
	0.5264	0.1615	+89	+ 4
	0.5230	0.1692	-20	-71
	0.5223	-0.1709	+50	-24
	0 5192	0.1775	+90	+34
	0.5151	0 1865	+24	-51
	0.5134	0.1900	- 9	-74
	0.5133	0.1902	-35	-74
	0.5082	-0.2008	+90	+32
	0.5052	0.2072	+32	47
	0.5034	0.2110	+60	-21
	0.5008	0 2167	+20	-62
	0.5007	0.2173	+45	-35
	0.5003	-0.2180	+48	32
	0.4979	0.2245	-16	-83
	0 4979	0.2245	+35	-46
	0.4970	0.2299	+80	+51
	0.4971	0.2304	+90	+34
	0.4974	-0.2312	+90	+17
	0.4980	0.2318	+30	-51
	0.4994	0.2321	+29	-53
	0.4997	0.2320	+87	+ 8
	0.5008	0.2317	+ 1	-90
	0.5030	-0.2307	+85	+ 4
	0.5071	0.2279	+83	+22
	0.5133	0.2224	+47	-33
	0.5196	-0.2156	+49	-29

JUNE.

1	10 57.4	+ 2 8.3	+0.2613	0.5334	-0.1983	+49	27
	16 30.8	+ 7 31.0	+0.0553	0.5378	0.1918	+37	-38
	17 2.1	+ 8 1.3	-0.4814	0.5382	0.1912	+10	-71
2	6 51.3	- 2 37.0	-0.3858	0.5499	-0.1720	+12	-65
	7 36.2	- 1 53.6	-0.1072	0.5505	0.1709	+26	-47
	8 19.1	- 1 12.1	-0.0900	0.5511	0.1698	+26	-46
	15 33.0	+ 5 46.9	+0.5570	0.5574	0.1578	+62	-10
	20 31.4	+10 34.8	+0.5775	0.5617	0.1488	+62	- 9
	20 58.5	+11 0.8	+0.6700	0.5621	-0.1480	+68	-

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS

JUNE.

The Star's Name.	Mag.	Red'ns from 1917.0. Δα	Δδ	Apparent Declination.	At Conjunction in R. A. Greenwich Mean Time.	Hour Angle, H	Y	x′	y′
		s	″	° ′	d h m	h m			
43 B. Libræ	5.7	+3.79	−18.8	−21 2.9	3 1 21.5	− 8 45.5	+0.1066	0.5658	−0.13
47 G. Libræ	6.1	3.81	17.4	21 42.9	5 13.9	− 5 1.4	+0.2755	0.5691	0.13
64 G. Libræ	5.8	3.86	16.8	22 5.9	9 25.5	− 0 59.1	+0.1392	0.5726	0.12
169 B. Libræ	6.0	3.96	15.2	22 52.3	18 18.0	+ 7 33.5	−0.0633	0.5796	0.10
177 B. Libræ	6.2	3.97	15.1	22 53.0	18 56.2	+ 8 10.3	−0.1155	0.5800	0.10
42 Libræ	5.0	+3.99	−15.1	−23 33.2	19 18.4	+ 8 31.7	+0.5394	0.5803	−0.10
31 B. Scorpii	5.4	4.05	14.1	24 17.4	4 0 49.7	−10 9.8	+0.7793	0.5842	0.08
32 B. Scorpii	5.3	4.04	14.0	23 44.1	0 50.9	−10 8.7	+0.2052	0.5843	0.08
40 B. Scorpii	5.4	4.08	13.7	24 35.8	2 42.6	− 8 21.3	+0.9337	0.5855	0.08
50 B. Scorpii	6.4	4.09	13.2	24 30.1	4 50.9	− 6 17.9	+0.6646	0.5869	0.07
57 B. Scorpii	5.7	+4.07	−12.9	−23 23.1	5 44.4	− 5 26.5	−0.5527	0.5875	−0.07
24 G. Scorpii	6.2	4.10	12.8	24 14.7	6 25.8	− 4 46.5	+0.2805	0.5879	0.07
27 G. Scorpii	5.8	4.08	12.7	23 28.1	6 47.2	− 4 26.1	−0.5431	0.5882	0.07
41 G. Scorpii	6.3	4.11	12.3	24 12.8	8 46.5	− 2 31.5	+0.0849	0.5894	0.06
85 B. Scorpii	6.0	4.14	12.2	25 16.2	9 12.6	− 2 6.4	+1.1402	0.5896	0.06
19 Scorpii	4.9	+4.12	−11.7	−23 58.4	11 30.0	+ 0 5.6	−0.3350	0.5910	−0.05
σ Scorpii	3.1	4.16	11.7	25 23.9	11 41.9	+ 0 17.0	+1.1137	0.5911	0.05
ρ Ophiuchi	4.7	4.11	11.2	23 15.6	13 27.5	+ 1 58.4	−1.1781	0.5920	0.05
22 Scorpii	4.8	4.17	10.8	24 56.2	15 15.1	+ 3 41.8	+0.4456	0.5929	0.04
126 B. Scorpii	6.1	4.18	9.7	24 18.6	19 43.0	+ 7 59.0	−0.3893	0.5951	0.03
88 B. Ophiuchi	6.3	+4.22	− 8.0	−24 58.2	5 2 49.2	− 9 11.8	+0.0868	0.5978	−0.01
26 Ophiuchi	5.8	4.22	8.0	24 51.9	2 53.7	− 9 7.5	−0.0202	0.5978	0.01
137 B. Ophiuchi	6.3	4.25	6.8	25 9.3	7 32.6	− 4 40.0	+0.2244	0.5991	−0.00
39 Ophiuchi	5.1	4.22	6.2	24 12.0	9 46.7	− 2 31.3	−0.7491	0.5997	+0.00
θ Ophiuchi	3.4	4.24	5.8	24 55.2	11 17.9	− 1 3.8	−0.0108	0.6000	0.00
191 B. Ophiuchi	6.3	+4.22	− 5.5	−24 10.2	12 29.7	+ 0 5.1	−0.7610	0.6002	+0.01
b Ophiuchi	4.3	4.22	5.4	24 6.1	12 58.9	+ 0 33.0	−0.8251	0.6003	0.01
136 G. Ophiuchi	6.3	4.27	5.3	25 52.3	13 10.0	+ 0 43.7	+0.9732	0.6002	0.01
51 Ophiuchi	4.8	4.21	4.9	23 54.1	14 55.0	+ 2 24.5	−1.0005	0.6005	0.01
63 Ophiuchi	6.1	4.24	2.5	24 52.3	23 52.9	+11 0.3	+0.2533	0.6009	0.04
4 Sagittarii	4.8	+4.20	− 2.1	−23 48.6	6 1 46.0	−11 11.2	−0.7338	0.6007	+0.04
7 Sagittarii	5.5	4.21	1.7	24 17.0	2 55.8	−10 4.2	−0.1979	0.6007	0.05
9 Sagittarii	6.0	4.21	1.6	24 21.8	3 19.2	− 9 41.9	−0.0958	0.6006	0.05
1 Sagittarii	5.2	4.18	− 0.9	23 43.2	6 20.0	− 6 48.4	−0.5739	0.6002	0.06
70 B. Sagittarii	6.4	4.21	+ 0.3	24 57.2	10 4.4	− 3 13.1	+0.9195	0.5996	0.07
24 Sagittarii	5.7	+4.16	+ 1.4	−24 5.7	14 50.6	+ 1 21.4	+0.4284	0.5984	+0.08
117 B. Sagittarii	5.8	4.13	1.8	23 34.6	16 37.9	+ 3 4.4	+0.0628	0.5979	0.09
26 Sagittarii	6.1	4.14	2.2	23 54.7	17 55.2	+ 4 18.5	+0.5178	0.5975	0.09
28 Sagittarii	5.6	4.08	2.4	22 28.8	19 40.5	+ 5 59.6	−0.7543	0.5969	0.09
30 Sagittarii	6.2	4.06	2.8	22 15.4	21 25.4	+ 7 40.3	−0.8016	0.5963	0.10
ν^1 Sagittarii	5.0	+4.08	+ 3.2	−22 50.8	22 42.5	+ 8 54.3	−0.0742	0.5958	+0.10
ν^2 Sagittarii	5.1	4.07	3.3	22 46.5	23 4.4	+ 9 15.4	−0.1077	0.5957	0.10
154 B. Sagittarii	5.9	4.08	3.5	23 16.8	23 25.1	+ 9 35.1	+0.4364	0.5955	0.10
168 B. Sagittarii	6.3	4.05	4.0	22 48.7	7 1 36.8	+11 41.6	+0.2101	0.5946	0.11
o Sagittarii	3.9	4.02	4.1	21 51.8	2 49.0	−11 9.1	−0.6046	0.5940	0.11
191 B. Sagittarii	6.5	+4.05	+ 4.7	−23 19.3	4 23.3	− 9 38.6	+1.0462	0.5934	+0.12
π Sagittarii	3.0	3.98	4.5	21 9.3	4 49.2	− 9 13.7	−1.0760	0.5932	0.12
199 B. Sagittarii	6.4	3.99	4.8	21 47.7	5 52.2	− 8 13.2	−0.3034	0.5927	0.12
222 B. Sagittarii	5.5	3.99	5.8	22 33.4	9 4.6	− 5 8.4	+0.8721	0.5912	0.13
50 Sagittarii	5.5	3.95	6.2	21 56.4	11 19.9	− 2 58.4	+0.5583	0.5893	0.13
253 B. Sagittarii	6.1	+3.92	+ 6.5	−21 29.0	13 9.5	− 1 13.1	+0.3562	0.5890	+0.

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JUNE.

The Star's	At Conjunction in R. A.					Limiting Parallels.	
	Greenwich Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
	d h m	h m				°	°
	7 19 22 0	+ 4 44.8	−0.2450	0.5854	+0.1563	+16	−55
	21 43 5	+ 7 0.9	−0 5781	0 5841	0 1613	− 1	−81
	8 12 8 4	− 3 7.0	+1.1838	0 5750	0 1897	+72	+33
	12 45.4	− 2 31.4	−1 1721	0 5746	0 1908	−37	−90
	12 47 3	− 2 29.6	+0.9105	0.5746	0.1908	+72	+11
	15 35.6	+ 0 12 5	+0 1726	0.5728	+0.1956	+42	−31
	17 11.1	+ 1 44.4	−1 0827	0.5718	0.1983	−29	−90
	17 42.6	+ 2 14 8	+0.1978	0 5714	0.1992	+44	−30
	9 1 26.8	+ 9 41 9	+0.1654	0 5665	0 2110	+44	−32
	8 55.9	− 7 5.0	+0.5216	0.5619	0.2210	+67	−13
	12 30.9	− 3 37.6	+1.0083	0.5598	+0 2252	+77	+16
	14 18.3	− 1 54 1	+0 1013	0.5598	0 2272	+42	−35
	19 17.2	+ 2 54.4	+0.2641	0.5560	0 2323	+52	27
	21 46.0	+ 5 18 1	−0.6514	0.5547	0 2347	+ 4	−86
	22 19.8	+ 5 50.7	−0.3224	0.5544	0 2352	+21	−60
	10 6 0.0	−10 44 9	−1.2480	0.5506	+0 2412	−37	−90
	12 18.4	− 4 39 3	−0.8455	0 5479	0 2451	− 6	−90
	15 31.2	− 1 33 0	−0 6050	0 5466	0 2468	+ 8	−80
	21 49 1	+ 4 32 3	+0.3505	0.5444	0 2492	+60	−22
	23 13.7	+ 5 54.1	+0.0251	0.5439	0 2497	+42	−40
	11 7 21.7	−10 14 1	+0.9045	0.5418	+0 2512	+87	+ 8
	19 13.2	+ 1 14 1	+1 1745	0.5397	0 2509	+90	+28
	20 49.3	+ 2 47.0	+0 5955	0.5396	0 2506	+79	− 9
	20 58.3	+ 2 55 7	+0 7697	0.5395	0.2506	+90	0
	12 1 17.1	+ 7 6.1	+0.8581	0.5392	0.2496	+90	+ 6
	6 0.0	+11 39 8	+0.6217	0.5391	+0.2480	+82	− 8
	12 5.0	− 6 27 1	−1 3238	0.5392	0 2452	−44	83
	20 12.6	+ 1 24 6	0 7589	0 5399	0 2404	0	−82
	22 6.2	+ 3 14 4	−0.2542	0.5402	0 2390	+27	−54
	13 7 45.1	−11 25.6	+0.8129	0.5418	0.2311	+90	+ 5
	10 27.2	− 8 48.9	−1.2590	0.5424	+0 2285	−37	−78
	19 30.7	− 0 3 4	−0.2530	0.5447	0.2189	+27	−51
	14 6 56.3	+10 59 1	−0.3207	0.5483	0 2044	+23	−53
	8 54.0	−11 7 1	+0.7828	0 5490	0.2017	+90	+ 7
	10 39.6	− 9 25.0	−0.0761	0.5496	0.1992	+ 4	−73
	13 47.0	− 6 24.0	−1.1126	0.5507	+0.1945	−25	−73
	14 30.4	− 5 42 0	−0 5002	0.5510	0.1934	+14	−62
	18 38.0	− 1 42 9	0 6201	0 5525	0 1870	+ 7	−69
	21 29.1	+ 1 2 2	−0.5541	0 5535	0.1823	+11	−64
	23 18.1	+ 2 47.5	+0 0036	0.5542	0.1793	+41	−32
	15 0 1.5	+ 3 29 4	+0 9655	0.5545	+0.1781	+90	+22
	0 33.7	+ 4 0.5	−1.3085	0.5547	0 1771	−51	−70
	3 54 0	+ 7 13 9	−1 1542	0.5559	0 1713	−31	−70
	9 26 2	−11 25.5	−0 2032	0 5580	0.1613	+30	−41
	14 35 6	− 6 26.9	+0.4247	0.5598	0.1514	+69	− 7
	21 26 5	+ 0 9.4	+0 7053	0 5622	+0.1377	+90	+10
	21 56.0	+ 0 37.9	+0 0668	0 5624	0.1306	+45	−24
	16 4 44.1	+ 7 11.4	+1 2348	0 5645	0 1223	+87	+52
	10 32.6	−11 12.6	+0.0322	0.5660	0.1095	+43	−23
	17 31.8	− 4 28.5	−0.8548	0.5677	0.0936	− 9	−68
	17 33.7	− 4 26.7	−0.6655	0.5677	+0.0935	+ 3	−63

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS

JUNE.

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JUNE.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1917.0. Δα	Δδ	Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		s	″	° ′	d h m	h m				°	°
G. Libræ	6.4	+3.61	−18.7	−20 40.8	30 6 1.2	− 2 7.4	+0.5258	0.5567	−0.1469	+59	−12
3. Libræ	6.1	3.62	18.6	20 58.9	6 28.6	− 1 41.0	+0.6190	0.5571	0.1461	+65	− 7
B. Libræ	5.7	3.72	18.8	21 2.9	10 55.0	+ 2 36 0	+0.0559	0.5611	0.1378	+30	−38
B. Libræ	6.1	3.76	17.6	21 42.9	14 50.3	+ 6 22.9	+0.2282	0.5646	0.1302	+39	−28
B. Libræ	5.8	+3.83	−17.0	−22 5.9	19 4.7	+10 28.1	+0.0042	0.5683	−0.1215	+31	−36

JULY.

Name.	Mag.	Δα	Δδ	Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
B. Libræ	6.0			52.3	1 4 2.4	− 4 54.0	−0.1028	0.5760	−0.1017	+18	−47
B. Libræ	[illegible]			53.0	4 40.9	− 4 16.9	−0.1546	0.5765	0.1003	+15	−50
Libræ				33.2	5 3.3	− 3 55.4	+0.5020	0.5768	−0.0904	+53	−13
B. Scorpii			[illegible]	17.4	10 37.0	+ 1 25.6	+0.7458	0.5813	0.0862	+66	+ 2
B. Scorpii				44.1	10 38.2	+ 1 26.8	+0.1706	0.5813	0.0862	+31	−31
B. Scorpii				35.8	12 30.6	+ 3 14.9	+0.9014	0.5828	0.0816	+65	+12
B. Scorpii		[illegible]		30.1	14 39.7	+ 5 19.0	+0.6332	0.5844	0.0762	+60	− 5
B. Scorpii	[illegible]			23.1	15 33.4	+ 6 10.7	−0.5848	0.5851	−0.0740	−10	−83
G. Scorpii	6.2			14.7	16 15.1	+ 6 50.7	+0.2497	0.5856	0.0722	+35	−26
G. Scorpii	5.8			28.1	16 36.5	+ 7 11.3	−0.5744	0.5858	0.0713	−10	−82
G. Scorpii	6.3			12.0	18 36.3	+ 9 6.5	+0.0554	0.5873	0.0662	+23	−38
B. Scorpii	6.0			16.2	19 2.5	+ 9 31.6	+1.1115	0.5875	[illegible]	+65	[illegible]
Scorpii	4.9		1	−25 58.4	21 20.4	+11 44.1	−0.3628	0.5891	−0.0591	0	−64
Scorpii	3.1		3	25 23.9	21 32.3	+11 55.5	+1.0863	0.5893	0.0585	+65	+28
Ophiuchi	4.7		5	23 15.6	23 18.3	−10 22.7	−1.2044	0.5904	0.0539	−55	−88
Scorpii	4.8		4	24 56.2	2 1 6.1	− 8 39.1	+0.4201	0.5916	0.0491	+43	−17
B. Scorpii	6.1		2	24 18.6	5 34.2	− 4 21.8	−0.4113	0.5942	0.0369	− 4	−68
B. Ophiuchi	6.3			58.2	12 39.9	+ 2 26.8	+0.0680	0.5978	−0.0170	+20	−37
Ophiuchi	5.8			51.9	12 44.4	+ 2 31.2	−0.0381	0.5979	0.0168	+14	−43
B. Ophiuchi	6.3			9.3	17 22.4	+ 6 57.9	+0.2087	0.5998	−0.0035	+26	−29
Ophiuchi	[illegible]			12.0	19 35.9	+ 9 5.9	−0.7603	0.6006	+0.0029	−26	−90
Ophiuchi				55.2	21 6.6	+10 32.9	−0.0235	0.6012	0.0073	+14	−42
B. Ophiuchi				10.2	22 18.0	+11 41.3	−0.7702	0.6014	+0.0107	−26	−90
Ophiuchi				6.1	22 47.0	11 50.9	−0.8336	0.6016	0.0121	−30	−90
G. Ophiuchi		[illegible]		52.3	22 58 1	−11 40.2	+0.9578	0.6016	0.0127	+64	+17
Ophiuchi				54.1	3 0 42.3	10 0 2	−1.0069	0.6021	0.0177	−41	−90
Ophiuchi	[illegible]			52.3	9 35.6	− 1 28.9	+0.2460	0.6036	0.0437	+32	−27
Sagittarii				48.6	11 27.5	+ 0 18.4	−0.7337	0.6038	+0.0492	−21	−90
Sagittarii				17.0	12 36.5	+ 1 24.6	−0.2002	0.6038	0.0525	+ 8	−53
Sagittarii			[illegible]	21.8	12 59.6	+ 1 46.6	−0.0986	0.6039	0.0537	+14	−47
Sagittarii	5.2			43.2	15 58.2	+ 4 37.9	−0.5718	0.6039	0.0623	−10	−82
B. Sagittarii	6.4			57.2	19 39.7	+ 8 10.2	+0.9132	0.6037	0.0729	+65	+13
Sagittarii	5.7			5.7	4 0 21.6	−11 19.5	+0.4278	0.6031	+0.0863	+46	−16
B. Sagittarii	5.8			34.6	2 7.2	− 9 38.3	+0.0661	0.6028	0.0913	+26	−37
Sagittarii	6.1			54.7	3 23.2	− 8 25.4	+0.5179	[illegible]	0.0948	+53	−12
Sagittarii	5.0			28.7	5 6.8	− 6 46.2	−0.7423	0.6022	0.0996	−17	−90
Sagittarii	6.2			15.4	6 49.8	− 5 7.3	−0.7880	0.6018	0.1043	−19	−90
Sagittarii	5.0			50.8	8 5.4	− 3 54.8	−0.0666	0.6014	+0.1077	+20	−45
Sagittarii	5.1			46.5	8 27.0	− 3 34.1	−0.0996	0.6013	0.1087	+19	−47
B. Sagittarii	5.9			16.8	8 47.2	− 3 14.7	+0.4397	0.6012	0.1096	+49	−16
B. Sagittarii	6.3			48.7	10 56.5	− 1 10.7	+0.2165	0.6006	0.1154	+36	−29
Sagittarii	3.9			51.8	12 7.3	− 0 2.8	−0.5897	0.6001	0.1185	− 6	−83
℞. Sagittarii	3.5			10.2	13 39.7	+ 1 25.8	+1.0457	0.5996	+0.1226	+67	+22

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS

JULY.

EMENTS FOR THE PREDICTION OF OCCULTATIONS.

JULY.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
ne.	Mag.	Red'ns from 1917.0. Δα	Δδ	Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Y	x′	y′	N.	S.
		s	″	° ′	d h m	h m				°	°
tis	5.8	+2.40	+10.0	+20 20.4	13 2 59.0	+ 7 29.3	+0.7256	0.5589	+0.1367	+90	+11
tis (*mean*)	4.6	2.40	9.8	21 0.7	3 28.8	+ 7 58.1	+0.0859	0.5590	0.1357	+46	−23
tis	5.0	2.34	9.2	20 44.4	10 20.2	− 9 25.1	+1.2555	0.5608	0.1212	+83	+54
tis	6.1	2.31	8.2	22 31.3	16 12.0	− 3 45.7	+0.0487	0.5621	0.1085	+44	−22
ri	5.4	2.28	7.2	24 1.9	23 15.5	+ 3 2.6	−0.8426	0.5634	0.0927	− 8	−66
ri	3.8	+2.27	+ 7.2	+23 51.3	23 17.6	+ 3 4.6	−0.6527	0.5634	+0.0926	+ 4	−62
ri	4.3	2.28	7.1	24 12.6	23 25.9	+ 3 12.6	−1.0164	0.5634	0.0923	−21	−66
ri	4.1	2.27	7.1	24 6.7	23 42.0	+ 3 28.2	−0.8871	0.5635	0.0917	−11	−66
ri	5.8	2.28	7.1	24 17.9	23 43.9	+ 3 30.0	−1.0827	0.5635	0.0916	−27	−66
ri	6.5	2.27	7.1	24 16.3	23 47.6	+ 3 33.6	−1.0491	0.5635	0.0915	−24	−66
ri	4.3	+2.27	+ 7.2	+23 41.6	23 55.3	+ 3 41.0	−0.4224	0.5635	+0.0912	+17	−47
ri	3.0	2.26	7.1	23 51.1	14 0 25.2	+ 4 9.8	−0.5460	0.5636	0.0901	+10	−55
ri	5.5	2.25	7.3	23 10.1	0 48.0	+ 4 31.7	+0.2129	0.5637	0.0892	+54	−12
ri	3.7	2.26	7.1	23 48.2	1 8.6	+ 4 51.7	−0.4295	0.5637	0.0884	+16	−47
ri	5.2	2.26	7.1	23 53.2	1 9.2	+ 4 52.2	−0.5174	0.5637	0.0884	+12	−53
ri	6.0	+2.22	+ 7.0	+22 56.3	4 33.9	+ 8 9.6	+0.7794	0.5643	+0.0805	+90	+20
ri	6.5	2.21	6.8	22 58.2	6 14.3	+ 9 46.3	+0.8772	0.5644	0.0766	+90	+27
ri	5.6	2.21	6.5	23 52.8	7 41.7	+11 10.7	+0.0170	0.5646	0.0732	+42	−20
ri	5.3	2.18	5.4	25 26.2	15 30.5	− 5 17.5	−1.1442	0.5652	0.0548	−34	−65
ri	6.1	2.16	5.6	24 6.6	16 8.2	− 4 41.0	+0.3067	0.5653	0.0533	+60	− 3
ri	6.2	+2.10	+ 4.8	+23 56.0	15 0 24.6	+ 3 17.6	+0.8566	0.5653	+0.0335	+90	+29
ri	6.3	2.07	4.2	24 27.7	6 1.0	+ 8 41.8	+0.4413	0.5650	0.0200	+70	+ 7
ri	6.0	2.06	4.2	23 49.3	6 41.6	+ 9 21.0	+1.1432	0.5649	0.0184	+90	+51
ri	5.6	2.07	4.0	24 55.5	6 49.4	+ 9 28.6	−0.0405	0.5649	0.0180	+38	−18
ri	5.5	2.04	3.7	24 9.4	11 8.0	−10 22.2	+0.8408	0.5644	+0.0077	+90	+31
ri	5.4	+2.00	+ 2.6	+25 5.1	20 17.6	− 1 32.2	−0.1884	0.5628	−0.0142	+30	−26
ri	5.1	1.97	2.5	23 59.2	23 0.1	+ 1 4.6	+0.9527	0.5622	0.0206	+90	+37
ri	5.1	1.99	2.0	25 51.1	16 0 50.5	+ 2 51.0	−1.1080	0.5617	0.0249	−30	−64
ri	5.0	1.95	1.8	24 32.5	4 55.6	+ 6 47.4	+0.1897	0.5606	0.0344	+52	− 8
ri	5.8	1.93	1.6	24 14.3	8 25.0	+10 9.5	+0.3836	0.5595	0.0425	+66	+ 2
ainorum	5.9	+1.90	+ 0.8	+24 26.4	14 52.6	− 7 36.5	−0.1561	0.5573	−0.0571	+32	−28
				NEW	*MOON.*						
nis	5.1	+1.72	− 8.0	+11 39.9	20 16 44.4	− 8 49.6	−0.2514	0.5075	−0.2082	+27	−51
nis	3.8	1.72	8.5	10 16.1	21 42.9	− 3 59.5	+0.2548	0.5055	0.2119	+55	−24
nis	5.9	+1.75	− 9.2	+ 9 19.5	21 6 1.8	+ 4 5.4	−0.4825	0.5026	−0.2174	+15	−67
nis	6.2	1.75	9.5	8 42.5	6 57.5	+ 4 59.5	+0.0003	0.5023	0.2179	+41	−39
nis	4.9	1.75	9.5	8 26.4	8 6.3	+ 6 6.4	+0.0475	0.5020	0.2186	+43	−36
nis	6.3	1.80	10.6	6 57.7	20 41.2	− 5 39.4	−1.0997	0.4986	0.2246	−22	−83
nis	6.5	1.79	10.8	6 6.8	20 50.1	− 5 30.8	−0.1897	0.4986	0.2247	+31	−50
nis	6.3	+1.86	−12.6	+ 1 27.7	22 13 0.3	+10 13.1	+1.3025	0.4962	−0.2292	+90	+41
nis	6.1	1.87	12.8	1 10.6	14 56.8	−11 53.6	+1.1741	0.4960	0.2295	+90	+27
nis	6.1	1.90	13.2	0 26.6	19 22.8	− 7 34.8	+0.9690	0.4958	0.2301	+90	+12
nis	5.3	1.94	13.4	+ 0 22.7	23 1 3.4	− 2 3.3	−0.2672	0.4958	0.2304	+27	−56
nis	6.3	1.99	14.1	− 1 14.8	8 57.6	+ 5 37.9	−0.2852	0.4962	0.2301	+26	−57
nis	5.1	+2.00	−14.5	− 2 33.0	10 18.5	+ 6 56.7	+0.8467	0.4963	−0.2300	+87	+ 5
nis	6.2	2.04	14.5	1 58.9	14 48.7	+11 19.5	−0.8167	0.4968	0.2294	− 3	−90
ginis	5.9	2.09	15.6	4 52.6	21 49.3	− 5 51.3	+0.7813	0.4981	0.2279	+85	+ 1
ginis	6.5	2.19	16.6	7 19.0	24 8 29.6	+ 4 31.4	+1.0570	0.5008	0.2245	+83	+18
ginis	*5.3*	*2.32*	*17.1*	*8 59.9*	21 7.2	− 7 12.2	+0.1068	0.5053	0.2183	+44	−35
inis	*6.0*	*+2.45*	*−17.8*	*−11 12.2*	25 8 0.5	+ 3 22.3	+0.1815	0.5104	−0.2112	+47	−31

ELEMENTS FOR THE PREDICTION OF OCCULTATI

JULY.

The Star's					At Conjunction in R. A.			
Name.	Mag.	Red'ns from 1917.0. Δα	Δδ	Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Y	x′
		s	″	° ′	d h m	h m		
75 Virginis	5.6	+2.73	−18.5	−14 56.5	26 3 46.1	− 1 27.4	+0.2412	0.5221
83 Virginis	5.6	2.82	18.5	15 46.0	9 32.6	+ 4 8.5	+0.0355	0.5261
85 Virginis	6.1	2.82	18.3	15 21.4	10 5.1	+ 4 40.0	−0.5100	0.5265
43 H. Virginis	5.5	3.06	18.2	17 49.1	27 0 27.7	− 5 24.7	−0.4034	0.5373
231 G. Virginis	6.4	3.08	18.2	18 12.3	1 14.5	− 4 39.4	−0.1196	0.5379
236 G. Virginis	5.7	+3.09	−18.2	−18 20.2	1 59.1	− 3 56.3	−0.1017	0.5386
9 G. Libræ	6.5	3.24	18.1	20 4.8	9 30.6	+ 3 20.4	+0.5606	0.5446
17 G. Libræ	6.4	3.33	17.9	20 49.8	14 40.9	+ 8 20.2	+0.5841	0.5490
18 G. Libræ	6.1	3.34	17.8	20 58.9	15 9.1	+ 8 47.4	+0.6782	0.5493
43 B. Libræ	5.7	3.47	18.3	21 2.8	19 42.4	−10 48.7	+0.1083	0.5532
47 G. Libræ	6.1	+3.50	−17.0	−21 42.9	23 43.7	− 6 55.7	+0.2819	0.5565
64 G. Libræ	5.8	3.58	16.4	22 5.8	28 4 4.8	− 2 43.8	+0.1456	0.5602
169 B. Libræ	6.0	3.76	15.2	22 52.3	13 16.3	+ 6 7.8	−0.0555	0.5678
177 B. Libræ	6.2	3.77	15.1	22 53.0	13 55.9	+ 6 46.0	−0.1080	0.5683
42 Libræ	5.0	3.79	15.3	23 33.2	14 18.8	+ 7 8.1	+0.5555	0.5686
31 B. Scorpii	5.4	+3.90	−14.5	−24 17.4	20 0.9	−11 22.5	+0.8002	0.5732
32 B. Scorpii	5.3	3.89	14.3	23 44.1	20 2.2	−11 21.3	+0.2192	0.5732
40 B. Scorpii	5.4	3.94	14.2	24 35.8	21 57.3	− 9 30.5	+0.9567	0.5747
50 B. Scorpii	6.4	3.98	13.7	24 30.1	29 0 9.5	− 7 23.2	+0.6851	0.5764
57 B. Scorpii	5.7	3.96	13.2	23 23.1	1 4.6	− 6 30.1	−0.5452	0.5770
24 G. Scorpii	6.2	+4.00	−13.3	−24 14.7	1 47.2	− 5 49.0	+0.2973	0.5776
27 G. Scorpii	5.8	3.99	13.0	23 28.1	2 9.2	− 5 27.9	−0.5351	0.5779
41 G. Scorpii	6.3	4.04	12.8	24 12.9	4 11.9	− 3 29.9	+0.1003	0.5794
85 B. Scorpii	6.0	4.08	13.0	25 16.2	4 38.7	− 3 4.1	+1.1665	0.5797
19 Scorpii	4.9	4.08	12.1	23 58.4	6 59.8	− 0 48.5	−0.3227	0.5814
σ Scorpii	3.1	+4.12	−12.5	−25 23.9	7 12.0	− 0 36.7	+1.1399	0.5815
ρ Ophiuchi	4.7	4.09	11.4	23 15.6	9 0.4	+ 1 7.5	−1.1727	0.5827
22 Scorpii	4.8	4.17	11.6	24 56.2	10 50.7	+ 2 53.6	+0.4662	0.5839
126 B. Scorpii	6.1	4.22	10.3	24 18.6	15 24.6	+ 7 16.8	−0.3742	0.5869
88 B. Ophiuchi	6.3	4.35	8.7	24 58.2	22 39.2	− 9 45.8	+0.1070	0.5910
26 Ophiuchi	5.8	+4.35	− 8.7	−24 51.9	22 43.8	− 9 41.3	−0.0005	0.5910
137 B. Ophiuchi	6.3	4.42	7.5	25 9.3	30 3 27.1	− 5 9.3	+0.2460	0.5934
39 Ophiuchi	5.1	4.42	6.6	24 12.0	5 43.0	− 2 58.9	−0.7306	0.5944
θ Ophiuchi	3.4	4.47	6.4	24 55.2	7 15.3	− 1 30.3	+0.0105	0.5950
191 B. Ophiuchi	6.3	4.46	5.9	24 10.2	8 27.8	− 0 20.7	−0.7415	0.5955
b Ophiuchi	4.3	+4.46	− 5.8	−24 6.1	8 57.4	+ 0 7.7	−0.8055	0.5957
136 G. Ophiuchi	6.3	4.52	6.1	25 52.4	9 8.6	+ 0 18.5	+0.9973	0.5957
51 Ophiuchi	4.8	4.48	5.2	23 54.1	10 54.6	+ 2 0.2	−0.9805	0.5964
63 Ophiuchi	6.1	4.61	2.8	24 52.3	19 55.6	+10 39.2	+0.2759	0.5990
4 Sagittarii	4.8	4.60	2.1	23 48.6	21 48.9	−11 32.1	−0.7097	0.5993
7 Sagittarii	5.5	+4.63	− 1.8	−24 17.0	22 58.7	−10 25.1	−0.1745	0.5996
9 Sagittarii	6.0	4.63	1.7	24 21.8	23 22.1	−10 2.8	−0.0727	0.5996
1 Sagittarii	5.2	4.64	− 0.7	23 43.2	31 2 22.6	− 7 9.6	−0.5491	0.6000
70 B. Sagittarii	6.4	4.72	+ 0.1	24 57.2	6 6.2	− 3 35.2	+0.9386	0.6003
24 Sagittarii	5.7	4.72	1.7	24 5.7	10 50.3	+ 0 57.3	+0.4487	0.6004
117 B. Sagittarii	5.8	+4.72	+ 2.3	−23 34.6	12 36.6	+ 2 39.3	+0.0851	0.6004
26 Sagittarii	6.1	4.74	2.6	23 54.7	13 53.0	+ 3 52.5	+0.5368	0.6003
28 Sagittarii	5.6	4.70	3.4	22 28.7	15 37.1	+ 5 32.4	−0.7262	0.6002
30 Sagittarii	6.2	4.70	3.9	22 15.4	17 20.6	+ 7 11.6	−0.7729	0.6001
ν¹ Sagittarii	5.0	4.73	4.2	22 50.8	18 36.5	+ 8 24.5	−0.0515	0.5999
ν² Sagittarii	5.1	+4.73	+ 4.3	−22 46.5	18 58.2	+ 8 45.2	−0.0847	0.599

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JULY.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1917.0. Δα	Δδ	Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		s	"	° '	d h m	h m				°	°
Sagittarii	5.9	+4.75	+ 4.3	-23 16.8	31 19 18.5	+ 9 4.7	+0.4546	0.5997	+0.1087	+50	-15
Sagittarii	6.3	4.74	5.0	22 48.7	21 28.1	+11 9.0	+0.2299	0.5994	0.1145	+37	-28
Sagittarii	3.9	+4.72	+ 5.5	-21 51.8	22 39.0	-11 43.0	-0.5771	0.5992	+0.1177	- 5	-81

AUGUST.

Name.	Mag.	Δα	Δδ	Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
B. Sagittarii	6.5	+4.78	+ 5.8	-23 19.2	1 0 11.5	-10 14.2	+1.0569	0.5990	+0.1218	+67	+24
Sagittarii	3.0	4.71	6.2	21 9.3	0 36.8	- 9 49.9	-1.0435	0.5988	0.1229	-34	-90
B. Sagittarii	6.4	4.73	6.4	21 47.7	1 38.6	- 8 50.6	-0.2791	0.5986	0.1256	+11	-58
B. Sagittarii	5.5	4.77	7.2	22 33.4	4 46.9	- 5 49.9	+0.8821	0.5979	0.1337	+67	+10
Sagittarii	5.5	+4.75	+ 7.9	-21 56.4	6 59.0	- 3 43.2	+0.5714	0.5973	+0.1393	+60	- 9
B. Sagittarii	6.1	4.74	8.5	21 29.0	8 45.8	- 2 0.8	+0.3711	0.5967	0.1438	+48	-20
Sagittarii	5.1	4.70	10.3	19 57.5	14 47.9	+ 3 46.8	-0.2243	0.5947	0.1584	+17	-54
Sagittarii	6.0	4.69	11.0	19 15.2	17 5.0	+ 5 58.4	-0.5519	0.5939	0.1638	+ 1	-78
Capricorni	5.2	4.65	14.6	18 28.8	2 6 58.4	- 4 41.0	+1.1725	0.5878	0.1934	+72	+32
B. Capricorni	6.4	+4.59	+14.9	-16 0.8	7 33.8	- 4 7.1	-1.1374	0.5876	+0.1946	-34	-90
Capricorni	5.0	4.64	14.8	18 5.1	7 35.7	- 4 5.3	+0.9042	0.5875	0.1947	+72	+10
B. Capricorni	6.2	4.61	15.5	16 48.4	10 17.0	- 1 30.2	+0.1795	0.5862	0.1998	+43	-31
Capricorni	5.2	4.56	15.9	15 14.5	11 48.3	- 0 2.5	-1.0506	0.5855	0.2026	-26	-90
B. Capricorni	5.9	4.58	16.0	16 24.9	12 18.4	+ 0 26.4	+0.2031	0.5852	0.2035	+44	-30
B. Capricorni	5.9	+4.53	+17.6	-14 48.0	19 41.4	+ 7 32.4	+0.1672	0.5815	+0.2160	+45	-32
B. Aquarii	6.5	4.47	19.0	13 32.5	3 2 48.3	- 9 36.7	+0.5106	0.5779	0.2266	+66	-13
Aquarii	5.5	4.45	19.7	13 13.8	6 12.2	- 6 20.5	+0.9830	0.5762	0.2312	+77	+14
B. Aquarii	6.5	4.41	20.0	11 55.4	7 54.0	- 4 42.6	+0.0971	0.5753	0.2333	+42	-35
B. Capricorni	6.2	4.37	20.7	10 56.7	12 36.8	- 0 10.2	+0.2526	0.5730	0.2388	+52	-27
Capricorni	5.3	+4.33	+21.0	- 9 27.5	14 57.4	+ 2 5.2	-0.6408	0.5718	+0.2412	+ 4	-84
Capricorni	6.3	4.33	21.1	9 39.2	15 29.4	+ 2 36.0	-0.3207	0.5716	0.2418	+21	-59
Aquarii	5.6	4.25	21.9	6 55.1	22 43.8	+ 9 34.5	-1.2264	0.5682	0.2483	-35	-90
Aquarii	5.7	4.20	22.6	5 47.7	4 4 40.5	- 8 41.6	-0.8387	0.5657	0.2524	- 5	-90
Aquarii	5.8	4.17	22.8	5 15.1	7 42.1	- 5 46.6	-0.6069	0.5644	0.2541	+ 8	-80
Aquarii	5.2	+4.12	+23.3	- 4 39.0	13 38.0	- 0 3.4	+0.3181	0.5622	+0.2566	+58	-24
B. Aquarii	6.3	4.11	23.4	3 58.8	14 57.8	+ 1 13.6	+0.0005	0.5617	0.2571	+40	-41
G. Piscium	6.2	4.05	23.9	2 50.0	22 37.4	+ 8 36.9	+0.8501	0.5592	0.2586	+87	+ 5
B. Piscium	6.4	3.95	24.2	- 0 9.5	5 9 48.6	- 4 35.2	+1.1049	0.5564	0.2579	+90	+22
Piscium	4.9	3.93	24.0	+ 0 48.5	11 19.4	- 3 7.5	+0.5402	0.5561	0.2575	+75	-12
Piscium	6.4	+3.93	+24.0	+ 0 40.4	11 27.9	- 2 59.4	+0.7097	0.5560	+0.2575	+90	- 3
Piscium	5.7	3.89	24.0	1 38.9	15 32.6	+ 0 56.9	+0.7931	0.5553	0.2562	+90	+ 2
Piscium	5.4	3.86	23.8	3 2.0	20 0.3	+ 5 15.3	+0.5598	0.5546	0.2544	+76	-11
Piscium	4.0	3.82	23.0	6 24.6	6 1 46.6	+10 49.6	-1.3416	0.5540	0.2512	-46	-81
Piscium	6.2	3.76	22.8	7 47.2	9 30.4	- 5 42.6	-0.7970	0.5535	0.2457	- 2	-82
Piscium	5.4	+3.74	+22.8	+ 7 44.1	11 18.7	- 3 58.0	-0.3053	0.5534	+0.2442	+25	-57
B. Piscium	6.5	3.67	22.2	8 54.5	20 32.2	+ 4 56.4	+0.7331	0.5535	0.2355	+90	+ 1
Piscium	5.7	3.67	21.4	11 31.6	23 7.6	+ 7 26.4	-1.2976	0.5536	0.2327	-42	-78
Piscium	6.3	3.61	20.7	12 31.0	7 7 50.8	- 8 8.5	-0.3176	0.5543	0.2222	+24	-54
Piscium	3.7	3.54	19.3	14 55.4	18 54.6	+ 2 32.3	-0.3903	0.5556	0.2067	+20	-57
Piscium	6.2	+3.52	+19.4	+14 14.6	20 49.0	+ 4 22.7	+0.6955	0.5559	+0.2038	+90	+ 2
Piscium	6.1	3.52	18.7	15 59.4	22 31.8	+ 6 1.9	-0.7422	0.5561	0.2011	0	-74
Arietis	6.4	3.51	18.1	17 0.2	8 1 34.5	+ 8 58.4	-1.1743	0.5566	0.1962	-31	-73
Arietis	5.8	3.50	18.2	16 32.9	2 16.9	+ 9 39.3	-0.5707	0.5567	0.1951	+10	-67
Arietis	5.1	3.47	17.6	17 25.1	6 18.9	-10 27.3	-0.6910	0.5574	0.1883	+ 3	-72
Arietis	6.4	+3.46	+17.2	+17 51.6	9 6.6	- 7 45.4	-0.0271	0.5579	+0.1831	+ 7	-69

ELEMENTS FOR THE PREDICTION OF OCCULTATIO

AUGUST.

Na
47 B. Arie
20 H¹. Arie
θ Arie
26 Arie
μ Arie
47 Arie
ε Arie
ζ Arie
66 Arie
16 Tau
17 Tau
q Tau
20 Tau
21 Tau
22 Tau
[redacted] Tau
η Tau
104 B. Tau
27 Tau
28 Tau
33 Tau
161 B. Tau
36 Tau
χ Tau
62 Tau
95 Tau
315 B. Tau
99 Tau
k Tau
103 Tau
118 Tau
121 Tau
125 Tau
132 Tau
412 B. Tau
1 Gem
3 Gem
5 Gem
8 Gem
9 Gem
36 B. Gem
52 B. Gem
d Gem
87 B. Gem
MA
44 Gem
120 B. Gem
δ Gem
56 Gem
149 B. Gem
61 Gem

LEMENTS FOR THE PREDICTION OF OCCULTATIONS.

AUGUST.

The Star's					
Name.	Mag.	Red'ns from 1917.0. Δα	Δδ	Apparent Declination.	Gree Mean
		s	"	° ′	d
eminorum	5.3	+2.28	− 3.0	+21 36.9	14
eminorum	6.3	2.21	3.7	20 30 9	1
eminorum	6.2	2.17	4.0	19 32.2	1
eminorum	5.2	2.17	4.2	20 6.2	2
eminorum	6.3	2.16	4.5	20 2.6	2
ancri	6.1	+2.13	− 4.6	+19 4.6	15
ancri (*mean*)	4.7	2.10	4.8	17 53.9	
				NEW	*MO*
eonis	5.3	+1.87	−12.2	+ 0 22.7	19
eonis	6.3	+1.89	−12.8	− 1 14.8	1
eonis	5.1	1.89	13.0	2 32.9	1
eonis	6.2	1.92	13.1	1 58.8	2
irginis	5.9	1.94	13.8	4 52.5	20
irginis	6.5	2.00	14.6	7 19.0	1
irginis	5.3	+2.09	−15.2	− 8 59.9	21
irginis	6.0	2.19	15.8	11 12 2	1
irginis	5.6	2.42	16.5	14 56.5	22 1
irginis	5.6	2.49	16.5	15 46.0	1
irginis	6.1	2.50	16.4	15 21.3	1
irginis	5.5	+2.70	−16.4	−17 49.1	23
irginis	6.4	2.72	16.4	18 12.3	
irginis	5.7	2.73	16.4	18 20.2	
ibræ	6.5	2.86	16.4	20 4.8	1
ibræ	6.4	2.95	16.3	20 49.8	2
ibræ	6.1	+2.96	−16.2	−20 58.0	2
ibræ	5.7	3.08	16.0	21 2 8	24
ibræ	6.1	3.12	15 6	21 42.8	
ibræ	5.8	3.19	15.1	22 5.8	1
ibræ	6.0	3.36	14.2	22 52.3	2
ibræ	6.2	+3.37	−14.1	−22 53.0	2
ibræ	5.0	3.39	14.3	23 33.2	2
corpii	5.4	3.51	13.6	24 17.4	25
corpii	5.3	3.50	13.4	23 44.1	
corpii	5.4	3.55	13.4	24 35 8	
corpii	2.5	+3.51	−12.5	−22 23.4	
corpii	6.4	3.59	13.0	24 30.1	
corpii	5.7	3.58	12.4	23 23.0	
corpii	6.2	3.61	12.6	24 14.7	
corpii	5.8	3.60	12.3	23 28.1	1
corpii	6.3	+3.65	−12.2	−24 12.8	1
corpii	4.9	3.70	11.5	23 58.4	1
phiuchi	4.7	3.71	10.9	23 15.6	1
corpii	4.8	3.79	11.1	24 56.2	1
corpii	6.1	3.85	9.9	24 18.6	2
phiuchi	6.3	+4.00	− 8.6	−24 58.2	26
phiuchi	5.8	4.00	8.5	24 51.0	
phiuchi	6.3	[illegible]	7.5	25 9.3	1
phiuchi	*5.1*	*4.09*	*6.6*	*24 12.0*	1
phiuchi	*3.4*	*4.14*	*6.5*	*24 55.2*	1
hiuchi	*6.3*	*+4.14*	*− 5.9*	*−24 10.2*	1

ELEMENTS FOR THE PREDICTION OF OCCULTATION[S]

AUGUST.

The Star's					At Conjunction in R. A.					
Name.	Mag.	Red'ns from 1917.0. Δα	Δδ	Apparent Declination.	Greenwich Mean Time.		Hour Angle, H	Y	x′	y′
		s	″	° ′	d	h m	h m			
b Ophiuchi	4.3	+4.14	− 5.9	−24 6.1	26	17 55.3	+10 53.5	−0.6629	0.5856	+0.01
136 G. Ophiuchi	6.3	4.20	6.3	25 52.4		18 6.9	+11 4.7	+1.1654	0.5856	0.01
51 Ophiuchi	4.8	4.16	5.2	23 54.1		19 56.3	−11 10.1	−0.8420	0.5863	0.01
63 Ophiuchi	6.1	4.33	3.2	24 52.4	27	5 14.9	− 2 13.5	+0.4235	0.5890	0.04
4 Sagittarii	4.8	4.32	2.4	23 48.6		7 11.8	− 0 21.2	−0.5774	0.5895	0.04
7 Sagittarii	5.5	+4.36	− 2.2	−24 17.0		8 23.8	+ 0 48.0	−0.0361	0.5897	+0.04
9 Sagittarii	6.0	4.36	2.0	24 21.8		8 47.9	+ 1 11.0	+0.0667	0.5898	0.05
1 Sagittarii	5.2	4.39	1.1	23 43.2		11 54.2	+ 4 10.1	−0.4193	0.5904	0.05
70 B. Sagittarii	6.4	4.48	− 0.4	24 57.2		15 44.6	+ 7 51.3	+1.0839	0.5909	0.06
24 Sagittarii	5.7	4.51	+ 1.2	24 5.7		20 37.1	−11 27.8	+0.5818	0.5912	0.08
117 B. Sagittarii	5.8	+4.51	+ 1.8	−23 34.6		22 26.5	− 9 42.7	+0.2115	0.5914	+0.08
26 Sagittarii	6.1	4.54	2.1	23 54.7		23 45.1	− 8 27.3	+0.6672	0.5914	0.09
28 Sagittarii	5.6	4.51	3.0	22 28.7	28	1 32.1	− 6 44.5	−0.6133	0.5914	0.09
30 Sagittarii	6.2	4.52	3.6	22 15.4		3 18.5	− 5 2.4	−0.6625	0.5914	0.10
ν^1 Sagittarii	5.0	4.56	3.8	22 50.8		4 36.5	− 3 47.4	+0.0658	0.5914	0.10
ν^2 Sagittarii	5.1	+4.56	+ 3.9	−22 46.5		4 58.7	− 3 26.2	+0.0317	0.5913	+0.10
154 B. Sagittarii	5.9	4.58	3.8	23 16.8		5 19.6	− 3 6.2	+0.5768	0.5913	0.10
168 B. Sagittarii	6.3	4.58	4.6	22 48.7		7 32.6	− 0 58.4	+0.3465	0.5912	0.11
o Sagittarii	3.9	4.57	5.1	21 51.8		8 45.4	+ 0 11.5	−0.4711	0.5911	0.11
191 B. Sagittarii	6.5	4.63	5.2	23 19.2		10 20.2	+ 1 42.6	+1.1788	0.5910	0.11
π Sagittarii	3.0	+4.56	+ 5.9	−21 9.3		10 46.2	+ 2 7.6	−0.9451	0.5909	+0.11
199 B. Sagittarii	6.4	4.59	6.0	21 47.7		11 49.5	+ 3 8.3	−0.1737	0.5908	0.12
222 B. Sagittarii	5.5	4.64	6.7	22 33.4		15 2.4	+ 6 13.7	+0.9951	0.5904	0.13
50 Sagittarii	5.5	4.64	7.5	21 56.4		17 17.6	+ 8 23.5	+0.6776	0.5901	0.13
253 B. Sagittarii	6.1	4.64	8.1	21 29.0		19 6.9	+10 8.4	+0.4726	0.5897	0.140
f Sagittarii	5.1	+4.63	+10.1	−19 57.5	29	1 16.6	− 7 56.3	−0.1375	0.5885	+0.155
57 Sagittarii	6.0	4.63	10.9	19 15.2		3 36.4	− 5 42.0	−0.4714	0.5879	0.160
π Capricorni	5.2	4.68	14.7	18 28.8		17 43.1	+ 7 51.8	+1.2407	0.5839	0.190
31 B. Capricorni	6.4	4.62	15.3	16 0.8		18 19.0	+ 8 26.4	−1.0832	0.5837	0.191
ρ Capricorni	5.0	4.67	14.9	18 5.1		18 20.8	+ 8 28.2	+0.9696	0.5837	0.191
47 B. Capricorni	6.2	+4.65	+15.8	−16 48.4		21 4.0	+11 5.1	+0.2359	0.5828	+0.196
τ Capricorni	5.2	4.61	16.4	15 14.5		22 36.3	−11 26.2	−1.0028	0.5823	0.199
61 B. Capricorni	5.9	4.64	16.4	16 24.9		23 6.8	−10 56.9	+0.2558	0.5822	0.200
95 B. Capricorni	5.9	4.63	18.3	14 48.0	30	6 33.4	− 3 47.3	+0.2056	0.5796	0.213
53 B. Aquarii	6.5	4.61	20.0	13 32.5		13 42.3	+ 3 5.5	+0.5352	0.5771	0.224
18 Aquarii	5.5	+4.61	+20.7	−13 13.8		17 6.6	+ 6 22.1	+1.0009	0.5760	+0.22
72 B. Aquarii	6.5	4.58	21.2	11 55.3		18 48.4	+ 8 0.1	+0.1108	0.5754	0.23
137 B. Capricorni	6.2	4.56	22.1	10 56.7		23 31.0	−11 27.8	+0.2565	0.5739	0.23
c^1 Capricorni	5.3	4.54	22.6	9 27.5	31	1 51.2	− 9 12.8	−0.6410	0.5732	0.23
c^2 Capricorni	6.3	4.54	22.7	9 39.2		2 23.1	− 8 42.0	−0.3223	0.5730	0.24
30 Aquarii	5.6	+4.50	+24.0	− 6 55.0		9 35.2	− 1 45.8	−1.2401	0.5708	+0.24
44 Aquarii	5.7	4.48	24.9	5 47.7		15 28.8	+ 3 54.7	−0.8649	0.5691	0.25
51 Aquarii	5.8	+4.47	+25.3	− 5 15.0		18 28.4	+ 6 47.9	−0.6400	0.5683	+0.25

SEPTEMBER.

κ Aquarii	5.2	+4.45	+25.9	− 4 39.0	1	0 19.7	−11 33.4	+0.2678	0.5669	+0.25
207 B. Aquarii	6.3	4.45	26.1	3 58.7		1 38.3	−10 17.7	−0.0506	0.5667	0.25
6 G. Piscium	6.2	4.42	26.8	2 50.0		9 10.4	− 3 1.9	+0.7767	0.5653	0.25
22 B. Piscium	6.4	4.38	27.5	− 0 9.4		20 7.8	+ 7 32.1	+1.0047	0.5637	0.2
κ *Piscium*	4.9	+4.37	+27.4	+ 0 48.5		21 36.6	+ 8 57.6	+0.4423	0.5636	+0

EMENTS FOR THE OF OCCULTATIONS.

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ELEMENTS FOR THE OF OCCULTATION

6
8
9
36 B.
d

87 B.
44
120 B.
δ
56

149 B.
61
63
79
209 B.

85
217 B.
10 H.
ζ
d^1

d^2
90 B.
54
o^1
222 B.

ξ
o
83 B.
89 B.
π

75
83
85

214 G.
43 H.
231 G.
236 G.
9 G.

17 G.
18 G.
43 B.
47 G.
64 G.

169 B.
177 B.
42
31 B.
32 B.

δ

ELEMENTS FOR THE N OF OCCULTATIONS.

Conjunction in R. A.				Limiting Parallels.	
Hour Angle, H	Y	x'	y'	N.	S.
h m				°	°
0 8.8	+1.1347	0.5635	−0.0734	+66	+33
1 4.7	−0.1251	0.5640	0.0713	+14	−48
.1 47.9	+0.7376	0.5644	0.0696	+66	+ 2
.1 49.8	−0.1150	0.5646	0.0687	+15	−47
9 45.5	+0.5354	0.5657	0.0639	+52	−10
6 55.0	+0.1011	0.5672	−0.0570	+25	−35
4 52.5	−0.7712	0.5682	0.0521	−22	−90
3 0.4	+0.9065	0.5691	0.0475	+65	+14
1 38.0	+0.0441	0.5712	0.0360	+20	−38
9 1.9	+0.5331	0.5742	0.0172	+48	−10
9 6.6	+0.4225	0.5742	−0.0170	+41	−16
0 4.0	+0.6719	0.5759	−0.0045	+59	− 2
7 45.0	−0.3342	0.5767	+0.0016	− 3	−62
6 10.6	+0.4260	0.5771	0.0058	+40	−16
4 56.4	−0.3485	0.5774	0.0090	− 3	−63
4 26.2	−0.4149	0.5776	+0.0104	− 7	−68
2 26.1	−0.5973	0.5781	0.0157	−16	−85
6 48.2	+0.6830	0.5800	0.0402	+62	− 1
8 44.4	−0.3339	0.5803	0.0454	+ 1	−62
9 56.0	+0.2150	0.5804	0.0486	+31	−28
10 20.1	+0.3192	0.5805	+0.0497	+37	−22
10 34.8	−0.1760	0.5808	0.0578	+10	−51
1 54.3	+0.8352	0.5811	0.0807	+66	+ 8
0 5.3	+0.4576	0.5811	0.0854	+49	−15
1 13.0	+0.9196	0.5811	0.0888	+66	+14
2 59.6	−0.3829	0.5810	+0.0934	+ 3	−65
4 45.6	−0.4346	0.5809	0.0980	+ 1	−69
6 0.5	−1.1204	0.5808	0.1011	−42	−90
6 3.4	+0.3044	0.5809	0.1012	+41	−23
6 25.4	+0.2604	0.5808	0.1022	+39	−25
6 46.2	+0.8231	0.5808	+0.1030	+67	+ 7
7 28.4	−1.2142	0.5808	0.1048	−52	−89
8 58.9	+0.5869	0.5806	0.1086	+59	− 7
10 11.4	−0.2452	0.5805	0.1117	+12	−55
.1 48.1	−0.7291	0.5803	0.1167	−14	−90
10 45.0	+0.0538	0.5802	+0.1193	+28	−37
7 32.5	+1.2384	0.5797	0.1271	+67	+44
5 17.8	+0.9130	0.5794	0.1324	+68	+13
3 28.8	−0.7026	0.5791	0.1368	+68	− 1
2 39.9	+0.0743	0.5779	0.1510	+32	−36
4 59.3	−0.2681	0.5774	+0.1562	+15	−56
4 21.4	−0.9124	0.5739	0.1865	−18	−90
4 19.5	+1.1719	0.5739	0.1865	+72	+32
1 37.2	+0.4221	0.5732	0.1916	+57	−18
0 5.4	−0.8381	0.5729	0.1945	−12	−90
0 24.8	+0.4383	0.5727	+0.1954	+58	−17
7 48.7	−0.3724	0.5708	0.2081	+56	−20
9 6.0	+0.6910	0.5691	0.2190	+76	− 3
5 43.7	+1.1545	0.5683	0.2237	+77	+28
4 3.0	−0.2492	0.5680	0.2260	+50	−27
0 36.3	+0.3853	0.5670	+0.2318	+50	−20

ELEMENTS FOR THE OF OCCULTATION

75		Pisciu
η		Pisciu
104		Pisciu
105		Pisciu
4		Arietis
ι		Arietis
35	B.	Arietis
47	B.	Arietis
20	H[1].	Arietis
26		Arietis
μ		Arietis
47		Arietis
ϵ		Arietis
ζ		Arietis
τ		Arietis
66		Arietis
17		Tauri
23		Tauri
η		Tauri
104	B	Tauri
27		Tauri
28		Tauri
133	B	Tauri
32		Tauri
33		Tauri
161	B.	Tauri
36		Tauri
62		Tauri
72		Tauri
284	B.	Tauri
95		*Tauri*
300	*B.*	*Tauri*

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

OCTOBER.

The Star's Name.	Mag.	Red'ns from 1917.0. Δα	Δδ	Apparent Declination.	At Conjunction in R. A. Greenwich Mean Time.	Hour Angle, H	Y	x′	y′	Limiting Parallels. N.	S.
		s	"	° ′	d h m	h m				°	°
Tauri	6.3	+4.65	+ 8.3	+24 27.8	5 1 59.8	+10 3.2	−0.1345	0.5758	+0.0206	+32	−24
Tauri	6.0	4.62	8.4	23 49.3	2 38.9	+10 40.9	+0.5508	0.5756	0.0190	+79	+13
Tauri	5.6	4.66	8.0	24 55.5	2 46.4	+10 48.1	−0.6049	0.5755	0.0187	+ 6	−54
Tauri	5.5	4.59	7.2	24 9.5	6 55.7	− 9 11.9	+0.2570	0.5740	+0.0083	+56	− 2
Tauri	5.4	4.54	4.6	25 5.1	15 47.8	− 0 39.4	−0.7465	0.5703	−0.0135	− 3	−65
Tauri	5.1	+4.48	+ 4.4	+23 59.2	18 25.7	+ 1 52.6	+0.3738	0.5691	−0.0198	+64	+ 8
Tauri	6.0	4.41	3.8	23 10.0	21 47.5	+ 5 7.1	+1.1655	0.5674	0.0279	+90	+53
Tauri	5.0	4.43	2.8	24 32.5	6 0 12.2	+ 7 26.5	−0.3701	0.5663	0.0335	+19	−39
Tauri	5.8	4.38	2.0	24 14.4	3 36.8	+10 43.7	−0.1763	0.5645	0.0415	+30	−28
Geminorum	4.3	4.31	1.6	23 16.2	6 44.2	−10 15.5	+0.7190	0.5628	0.0486	+90	+19
Geminorum	5.6	+4.28	+ 1.1	+23 7.7	9 10.8	− 7 54.2	+0.7451	0.5614	−0.0541	+90	+21
Geminorum	5.9	4.32	0.4	24 26.4	9 56.7	− 7 9.9	−0.7005	0.5610	0.0558	0	−64
Geminorum	6.3	4.26	0.9	22 55.7	10 18.7	− 6 48.7	+0.8970	0.5608	0.0566	+90	+30
Gemin. (*var.*)	3.2	4.23	0.8	22 31.9	11 26.4	− 5 43.3	+1.2570	0.5601	0.0591	+79	+62
Geminorum	6.1	4.27	0.1	23 59.9	12 2.7	− 5 8.3	−0.3498	0.5597	0.0604	+20	−40
Geminorum	6.2	+4.26	+ 0.1	+23 46.2	12 20.3	− 4 51.4	−0.1236	0.5595	−0.0611	+33	−27
Geminorum	3.2	4.19	− 0.1	22 33.4	14 59.2	− 2 18.0	+1.0088	0.5580	0.0669	+90	+37
Geminorum	6.0	4.20	0.6	23 22.4	16 7.2	− 1 12.5	+0.0546	0.5574	0.0693	+43	−18
Geminorum	5.2	4.01	2.7	21 51.6	7 3 47.8	+10 4.0	+0.7376	0.5501	0.0935	+90	+16
Geminorum	5.8	4.07	3.4	23 42.0	3 58.3	+10 14.2	−1.2687	0.5500	0.0938	−53	−66
Geminorum	5.9	+3.96	− 4.3	+22 45.7	10 4.3	− 7 52.2	−0.8642	0.5462	−0.1055	−10	−67
Geminorum	6.5	3.89	4.6	21 23.5	12 19.4	− 5 41.7	+0.3798	0.5447	0.1098	+64	− 5
Geminorum	3.5	3.86	5.5	22 8.1	16 58.0	− 1 12.2	−0.9580	0.5418	0.1182	−16	−68
Geminorum	5.2	3.80	5.1	20 36.0	17 50.9	− 0 21.1	+0.6072	0.5412	0.1198	+84	+ 6
Geminorum	6.4	3.79	6.0	21 42.1	20 8.6	+ 1 52.2	−0.8714	0.5398	0.1238	−10	−69
Geminorum	5.8	+3.77	− 5.5	+20 25.4	20 11.9	+ 1 55.3	+0.5145	0.5397	−0.1239	+75	0
Geminorum	5.3	3.79	6.1	21 36.9	20 33.6	+ 2 16.3	−0.8289	0.5395	0.1245	− 7	−68
Geminorum	6.3	3.66	7.2	20 30.9	8 4 53.0	+10 19.7	−0.7250	0.5343	0.1383	0	−69
Geminorum	5.0	3.61	6.6	18 42.7	5 23.0	+10 48.7	+1.1771	0.5339	0.1391	+90	+43
Geminorum	6.2	3.59	7.4	19 32.2	8 11.2	−10 28.5	−0.1211	0.5322	0.1435	+33	−36
Geminorum	5.2	+3.58	− 7.9	+20 6.1	9 59.2	− 8 43.9	−1.0012	0.5311	−0.1462	−19	−70
Geminorum	6.3	3.55	8.3	20 2.5	12 29.8	− 6 17.9	−1.3090	0.5296	0.1500	−55	−69
Cancri	6.1	3.50	8.3	19 4.5	14 27.5	− 4 23.9	−0.5455	0.5284	0.1528	+10	−62
Cancri (*mean*)	4.7	3.44	8.6	17 53.8	18 9.6	− 0 48.7	+0.1724	0.5263	0.1581	+50	−22
Cancri	6.2	3.33	9.5	17 19.1	9 1 0.0	+ 5 49.1	−0.3041	0.5225	0.1672	+24	−49
Cancri	6.3	+3.24	− 9.6	+15 35.9	6 14.2	+10 53.9	+0.6975	0.5196	−0.1737	+90	+ 4
Cancri	6.3	3.15	10.6	15 39.4	13 53.9	− 5 40.2	−0.7314	0.5158	0.1825	0	−74
Cancri	5.1	3.12	11.0	15 38.3	17 7.4	− 2 32.4	−1.3069	0.5143	0.1860	−48	−74
Cancri	6.3	2.95	11.2	11 50.8	10 4 1.1	+ 8 2.5	+0.8031	0.5096	0.1966	+90	+ 7
Leonis	5.1	2.86	12.1	11 39.9	11 32.6	− 8 38.9	−0.4988	0.5069	0.2029	+14	−66
Leonis	5.2	+2.84	−11.6	+10 4.8	11 33.8	− 8 37.8	+1.2546	0.5069	−0.2029	+90	+41
Leonis	3.8	2.79	12.2	10 16.0	16 31.2	− 3 48.8	+0.0315	0.5054	0.2067	+42	−36
Leonis	5.9	2.71	12.7	9 19.4	11 0 49.5	+ 4 15.5	−0.6622	0.5031	0.2122	+ 5	−79
Leonis	6.2	2.70	12.6	8 42.4	1 45.1	+ 5 9.6	−0.1749	0.5029	0.2128	+31	−48
Leonis	4.9	2.68	12.6	8 26.4	2 53.8	+ 6 16.3	−0.1217	0.5027	0.2135	+34	−45
Leonis	6.3	+2.57	−13.4	+ 6 57.6	15 26.1	− 5 32.1	−1.1991	0.5005	−0.2198	−31	−83
Leonis	6.5	2.55	13.1	6 6.7	15 35.0	− 5 23.4	−0.2893	0.5005	0.2199	+25	−56
Leonis	6.3	2.41	13.2	1 27.7	12 7 39.1	+10 14.4	+1.2931	0.4995	0.2249	+90	+41
Leonis	6.1	2.40	13.3	1 10.6	9 34.6	−11 53.3	+1.1761	0.4995	0.2253	+90	+29
Leonis	6.1	2.36	13.4	0 26.6	13 58.3	− 7 36.8	+0.9969	0.4997	0.2260	+90	+15
Leonis	5.3	+2.34	−13.7	+ 0 22.7	19 35.8	− 2 8.6	−0.2052	0.5001	−0.226[illegible]	+29	−5[illegible]

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS

OCTOBER.

Name.
388 B. Leonis
e Leonis
481 B. Leonis
47 G. Libræ
64 G. Libræ
169 B. Libræ
177 B. Libræ
42 Libræ
32 B. Scorpii
δ Scorpii
57 B. Scorpii
24 G. Scorpii
27 G. Scorpii
41 G. Scorpii
19 Scorpii
ρ Ophiuchi
22 Scorpii
VENUS
126 B. Scorpii
24 Ophiuchi
88 B. Ophiuchi
26 Ophiuchi
137 B. Ophiuchi
39 Ophiuchi
θ Ophiuchi
191 B. Ophiuchi
b Ophiuchi
51 Ophiuchi
63 Ophiuchi
4 Sagittarii
21 G. Sagittarii
7 Sagittarii
9 Sagittarii
1 Sagittarii
24 Sagittarii
117 B. Sagittarii
26 Sagittarii
28 Sagittarii
30 Sagittarii
33 Sagittarii
ν^1 Sagittarii
ν^2 Sagittarii
154 B. Sagittarii
ξ Sagittarii
168 B. Sagittarii
o Sagittarii
π Sagittarii
199 B. Sagittarii
50 Sagittarii

MENTS FOR THE PREDICTION OF OCCULTATIONS.

OCTOBER.

The Star's					At Conjunction in R. A.					Limiting Parallels.	
-	Mag.	Red'ns from 1917.0. Δα	Δδ	Apparent Declination.	Greenwich Mean Time.	Hour Angle, H	Y	x′	y′	N.	S.
		s	″	° ′	d h m	h m				°	°
arii	6.1	+3.79	+ 6.9	−21 29.0	22 10 0.9	+ 4 37.9	+0.9853	0.5722	+0.1349	+69	+18
arii	6.1	3.75	8.2	19 2.1	12 23.0	+ 6 54.7	−1.2067	0.5715	0.1399	−47	−90
arii	5.1	3.81	8.7	19 57.5	16 34.6	+10 57.2	+0.3481	0.5703	0.1486	+48	−21
arii	6.0	3.83	9.5	19 15.2	19 3.6	−10 39.2	+0.0003	0.5696	0.1536	+29	−40
corni	6.4	3.91	13.9	16 0.8	23 10 45.6	+ 4 28.6	−0.6621	0.5648	0.1827	− 3	−88
corni	6.2	+3.90	+14.2	−15 19.9	11 47.0	+ 5 27.7	−1.1682	0.5645	+0.1844	−37	−90
corni	6.2	3.97	14.1	16 48.5	13 41.8	+ 7 18.5	+0.6905	0.5640	0.1876	+73	− 2
corni	5.2	3.94	15.0	15 14.5	15 20.3	+ 8 53.4	−0.5905	0.5635	0.1903	+ 2	−80
corni	5.9	3.97	14.8	16 25.0	15 52.8	+ 9 24.8	+0.7054	0.5634	0.1913	+74	− 1
corni	5.9	4.01	16.7	14 48.0	23 49.4	− 6 55.6	+0.6313	0.5611	0.2034	+72	− 6
rii	6.5	+4.06	+18.4	−13 32.5	24 7 26.4	+ 0 25.4	+0.9465	0.5592	+0.2138	+76	+13
rii	6.5	4.08	19.9	11 55.4	12 52.1	+ 5 39.7	+0.4904	0.5579	0.2205	+65	−14
corni	6.2	4.11	21.0	10 56.7	17 52.3	+10 29.4	+0.6215	0.5569	0.2261	+75	− 7
corni	5.3	4.10	21.9	9 27.5	20 21.0	−11 7.0	−0.3110	0.5565	0.2287	+21	−58
corni	6.3	4.11	21.9	9 39.2	20 54.8	−10 34.4	+0.0145	0.5564	0.2292	+38	−39
rii	5.6	+4.14	+23.8	− 6 55.0	25 4 31.9	− 3 13.2	−0.9590	0.5553	+0.2361	−14	−90
rii	5.7	4.18	24.9	5 47.7	10 44.8	+ 2 47.0	−0.6002	0.5546	0.2408	+ 7	−80
rii	5.8	4.20	25.4	5 15.0	13 53.7	+ 5 49.3	−0.3836	0.5545	0.2428	+19	−63
rii	5.2	4.24	26.2	4 39.0	20 2.2	+11 45.2	+0.5169	0.5543	0.2461	+71	−13
rii	6.3	4.25	26.6	3 58.7	21 24.4	−10 55.5	+0.1844	0.5543	0.2467	+50	−30
um	6.2	+4.31	+27.5	− 2 49.9	26 5 15.9	− 3 20.1	+0.9890	0.5545	+0.2493	+87	+15
um	6.3	4.30	28.4	0 15.1	6 20.4	− 2 17.8	−1.3165	0.5546	0.2495	−44	−88
um	6.4	4.39	29.0	− 0 9.4	16 36.9	+ 7 37.5	+1.1582	0.5557	0.2503	+90	+27
um	4.9	4.40	29.2	+ 0 48.6	18 8.3	+ 9 5.7	+0.5780	0.5560	0.2502	+77	−10
um	6.4	4.39	29.2	0 40.5	18 16.9	+ 9 14.0	+0.7474	0.5560	0.2501	+90	0
um	5.7	+4.42	+29.7	+ 1 39.0	22 22.5	−10 48.8	+0.7995	0.5567	+0.2495	+90	+ 3
um	5.4	4.46	30.0	3 2.1	27 2 50.0	− 6 30.6	+0.5312	0.5576	0.2484	+74	−12
um	6.2	4.58	30.9	7 47.3	16 11.0	+ 6 22.4	−0.9199	0.5611	0.2418	−10	−82
um	5.4	4.59	30.9	7 44.3	17 57.2	+ 8 4.8	−0.4432	0.5617	0.2406	+17	−65
um	6.5	4.67	30.6	8 54.6	28 2 57.0	− 7 14.5	+0.5226	0.5647	0.2332	+73	−10
um	6.3	+4.80	+30.4	+12 31.2	13 52.2	+ 3 17.2	−0.5894	0.5687	+0.2212	+ 8	−72
um	3.7	4.92	29.4	14 55.6	29 0 27.2	−10 30.8	−0.7261	0.5728	0.2067	+ 1	−75
um	6.2	4.92	29.1	14 14.7	2 16.1	− 8 45.9	+0.3272	0.5736	0.2040	+60	−17
um	6.1	4.97	29.0	15 59.6	3 53.8	− 7 11.9	−1.0909	0.5742	0.2014	−24	−74
is	5.8	5.00	28.5	16 33.0	7 27.5	− 3 46.1	−0.9431	0.5756	0.1956	−13	−73
is	5.1	+5.05	+27.9	+17 25.2	11 16.6	− 0 5.4	−1.0815	0.5771	+0.1890	−24	−73
is	6.4	5.07	27.5	17 51.8	13 55.0	+ 2 27.0	−1.0331	0.5780	0.1843	−20	−72
is	6.5	5.08	27.2	17 38.5	15 35.8	+ 4 4.1	−0.5050	0.5786	0.1812	+13	−61
is	6.4	5.08	27.0	16 50.6	16 16.0	+ 4 42.9	+0.4186	0.5789	0.1799	+66	−10
is	6.2	5.19	25.4	19 29.7	30 0 59.3	−10 53.7	−0.7545	0.5818	0.1627	− 2	−71
is	5.7	+5.22	+24.4	+19 39.9	5 46.5	− 6 17.5	−0.1727	0.5832	+0.1526	+30	−38
is	5.8	5.28	22.9	20 20.6	12 8.6	− 0 9.9	+0.0692	0.5849	0.1385	+44	−23
is (*mean*)	4.6	5.28	22.8	21 0.9	12 36.1	+ 0 16.5	−0.5487	0.5850	0.1375	+10	−59
is	5.0	5.30	21.2	20 44.6	18 56.4	+ 6 22.2	+0.5524	0.5862	0.1227	+78	+ 3
is	5.2	5.31	20.6	20 51.3	21 29.1	+ 8 49.0	+0.7451	0.5866	0.1167	+90	+15
is	5.2	+5.30	+20.5	+20 27.1	22 6.4	+ 9 24.8	+1.2270	0.5867	+0.1152	+88	+52
is	6.0	5.30	20.4	20 30.9	22 46.8	+10 3.7	+1.2398	0.5868	0.1135	+86	+54
is	6.1	5.37	19.7	22 31.5	31 0 22.1	+11 35.4	−0.6288	0.5870	0.1097	+ 4	−62
i	4.3	5.42	17.6	23 41.7	7 31.9	− 5 31.5	−1.1058	0.5875	0.0919	−30	−66
i	3.0	5.43	17.5	23 51.3	7 59.6	− 5 4.8	−1.2262	0.5875	0.0907	−45	−66
	5.5	+5.41	+17.5	+23 10.3	8 20.9	− 4 44.3	−0.4962	0.5875	+0.0899	+12	−52

ELEMENTS FOR THE OF OCCULTATION

OCTOBER.

The S
Name.
27 Tauri
28 Tauri
183 B. Tauri
32 Tauri
33 Tauri
161 B. Tauri
36 Tauri
192 B. Tauri
62 Tauri
v Tauri
72 Tauri

NOVEMBER.

284 B. Tauri	6.0	+5.39	+11.8	+23 10.5	1	3 40.8	−10 9.4	+0.7614	0.5857	+0.04
τ Tauri	4.3	+5.36	+11.2	+22 48.1		6 0.8	− 7 54.7	+1.2361	0.5852	+0.03
95 Tauri	6.2	5.40	10.9	23 56.1		6 23.7	− 7 32.7	+0.0739	0.5851	0.03
300 B. Tauri	6.2	[redacted]	10.7	23 28.8		7 24.2	− 6 34.5	+0.5787	0.5848	0.03
315 B. Tauri	6.3	5.41	[redacted]	24 27.8		11 40.1	− 2 28.5	[redacted]	0.5835	0.01
99 Tauri	6.0	5.38	9.1	23 49.3		12 18.4	− 1 51.7	+0.3423	0.5834	0.01
k Tauri	5.6	+5.42	+ 8.8	+24 55.5		12 25.8	− 1 44.6	−0.8033	0.5833	+0.01
103 Tauri	5.5	5.37	7.8	24 9 5		16 29.8	+ 2 10.2	+0.0445	0.5819	+0.00
118 Tauri	5.4	5 36	4 9	25 5 1	2	1 10.6	+10 31.2	−0.9624	0.5783	−0.01
121 Tauri	5.1	5.29	4.4	23 59.2		3 45.1	−11 0.0	+0.1437	0.5770	0.02
394 B Tauri	6.0	5.23	3 6	23 10.0		7 2.6	− 7 49 9	+0.9232	0.5754	0.02
132 Tauri	5.0	+5.27	+ 2.6	+24 32.5		9 24.1	− 5 33.6	−0.6005	0.5741	−0.03
412 B. Tauri	5.8	5.23	1.6	24 14.3		12 44.3	− 2 20.8	−0.4128	0.5722	0.04
1 Geminorum	4.3	5.16	0 9	23 16.1		15 47.7	+ 0 35.8	+0.4690	0.5704	0.05
3 Geminorum	5.6	5.14	+ 0.4	23 7.7		18 11.2	+ 2 54.1	+0.4930	0.5690	0.05
5 Geminorum	5.9	5 18	0.3	24 26.4		18 56.1	+ 3 37.5	−0 9392	0.5685	0.05
6 Geminorum	6.3	+5.12	+ 0 1	+22 55.7		19 17.6	+ 3 58.1	+0.6421	0.5683	−0.06
η Gemin. (*var.*)	3 2	5.09	− 0.1	22 31.9		20 23.9	+ 5 2.0	+0.9973	0.5676	0.06
8 Geminorum	6 1	5 14	0.7	23 59.9		20 59.4	+ 5 36.3	−0.5943	0.5672	0.06
9 Geminorum	6.2	5.13	0 7	23 46 2		21 16.6	+ 5 52.8	−0.3706	0.5670	0.06
μ Geminorum	3 2	5 06	1 2	22 33 4		23 52.2	+ 8 22.9	+0.7477	0.5654	0.06
36 B. Geminorum	6.0	+5.08	− 1.6	+23 22.4	3	0 58.8	+ 9 27.0	−0.1983	0.5647	−0.071
d Geminorum	5.2	4 90	4.4	21 51 5		12 25.1	− 3 30 9	+0.4673	0.5568	0.09
ζ Gemin. (*var.*)	3.7	4.79	5.4	20 41.5		18 3.9	+ 1 56.3	+1.1527	0.5528	0.10
44 Geminorum	5.9	4.86	6 2	22 45 7		18 34.4	+ 2 25 7	−1 1246	0.5525	0.10
120 B Geminorum	6 5	4.78	6 7	21 23 5		20 47 0	+ 4 33.8	+0.1061	0.5509	0 111
δ Geminorum	3.5	+4.75	− 7.7	+22 8.0	4	1 20.5	+ 8 58.2	−1.2227	0.5476	−0 11
56 Geminorum	5.2	4.68	7.4	20 36.0		2 12.4	+ 9 48.3	+0.3279	0.5469	0 12
149 B. Geminorum	6.4	4.68	8.3	21 42.0		4 27.8	+11 59.2	−1.1390	0.5453	0.12
61 Geminorum	5.8	4 66	7.9	20 25.3		4 30.9	−11 57.8	+0.2346	0.5452	0 12
63 Geminorum	5.3	4 69	8.5	21 36.8		4 52.3	−11 37.2	−1 0972	0.5450	0.12
79 Geminorum	6.3	+4.55	− 9.9	+20 30.8		13 3.6	− 3 42.1	−0.9989	0.5391	−0 13
g Geminorum	5 0	4.48	9.4	18 42.7		13 33.0	− 3 13.5	+0.8874	0.5388	0.14
209 B. Geminorum	6.2	4.48	10.3	19 32 1		16 18.7	− 0 33 2	−0.4013	0.5368	0 14
85 Geminorum	5.2	4.47	10.9	20 6.1		18 5 0	+ 1 9.7	−1.2751	0.5356	0.14
3 Cancri	5.7	4.37	10.5	17 32.0		20 35.5	+ 3 35.4	+1.1417	0.5338	0.1
10 H. Cancri	6.1	+4.38	−11.4	+19 4.5		22 29.8	+ 5 25.9	−0.8246	0.5325	−0

EMENTS FOR THE OF OCCULTATIONS.

ELEMENTS FOR THE OF OCCULTATIONS

ELEMENTS FOR THE OF OCCULTATIONS.

	Name.										y'	Limiting Parallels. N.	Limiting Parallels. S.
												°	°
	Tauri									60	+0.0890	−33	−66
	Tauri									61	0.0888	−50	−66
.	Tauri									62	0.0879	+10	−53
	Tauri									62	0.0871	−34	−66
	Tauri									62	0.0871	−46	−66
.	Tauri									63	+0.0863	+90	+18
	Tauri									66	0.0793	+90	+17
	Tauri									66	0.0791	+40	−21
.	Tauri									68	0.0752	+46	−16
	Tauri									69	0.0718	− 3	66
.	Tauri									70	+0.0630	+86	+57
	Tauri									70	0.0516	+12	−48
	Tauri									70	0.0491	+90	+45
	Tauri									70	0.0481	+90	+32
.	Tauri									67	0 0386	+90	+20
	Tauri									61	+0 0325	+90	+54
	Tauri									64	0.0315	+41	−17
B.	Tauri									62	0.0289	+76	+10
B.	Tauri									55	0.0179	+17	−40
	Tauri									54	0.0163	+57	− 1
	Tauri									53	+0.0160	−12	−65
	Tauri									43	+0.0055	+38	16
	Tauri									15	−0.0164	−26	−65
	Tauri									05	0.0228	+43	−14
B.	Tauri									91	0.0309	+90	+28
	Tauri									80	−0.0366	0	−64
B.	Tauri									64	0.0447	+10	−49
	Geminoru									48	0.0519	+63	0
	Geminoru									35	0.0574	+64	0
	Geminoru									31	0.0592	−25	66
	Geminoru									29	−0 0600	+76	+ 8
	Gemin. (									23	0 0625	+90	+28
	Geminoru									19	0 0639	− 1	65
	Geminoru									17	0 0645	+12	−49
	Geminoru									02	0.0703	+87	+12
B.	Geminoru									95	0.0728	+22	−39
	Geminoru									21	−0.0971	+61	− 6

DECEMBER.

	Gemin. (*var.*)	3.7	+5.61	− 7.6	+20 41.5	1	3 24.8	−10 51.8	−1.0069	0.5582	−0.1082	+90	+32
	Geminorum	5.9	5.68	8.1	22 45.6		3 54.9	−10 25.8	1.2598	0.5578	0.1092	−49	−67
B.	Geminorum	6.5	5.60	8.9	21 23.4		6 5.6	8 19.6	−0.0371	0.5563	0.1134	+38	−27
	Geminorum	5.2	5.53	9.9	20 35.9		11 26.6	− 3 9.6	+0.1776	0.5524	0.1234	+51	−17
B.	Geminorum	6.4	5.53	10.8	21 12.0		13 40.0	− 1 0.7	−1.2838	0.5507	0.1274	−53	68
	Geminorum	5.8	+5.50	−10.5	+20 25.3		13 43.1	− 0 57.7	+0.0828	0.5507	−0.1275	+45	−22
	Geminorum	5.3	5.54	10.9	21 36.8		14 4.1	− 0 37.4	−1.2426	0.5504	0.1281	−45	−68
	Geminorum	6.3	5.42	12.8	20 30.8		22 8.4	+ 7 10.7	1.1522	0.5445	0.1417	−32	−69
	Geminorum	5.0	5.35	12.5	18 42.6		22 37.4	+ 7 38.8	+0.7233	0.5441	0.1425	+90	+10
B.	*Geminorum*	*6.2*	*5.35*	*13.4*	19 32.1	2	1 20.7	+10 16.8	0.5607	0.5421	0.1468	+ 9	62
	Cancri	*5.7*	*+5.24*	*−13.0*	+17 32.0		5 33.9	− 9 38.3	+0.9705	0.5390	−0.1532	+90	+2

ELEMENTS FOR THE OF OCCULTATION

10	H.	C
ζ		C
δ^2		C
90	B.	C
54		C
209	B.	C
222	B.	C
ξ		L
λ		L
o		L
83	B.	L
89	B.	L
π		L
14		S
155	B.	L
237	B.	L
65		L
ρ^1		L
ρ^2		L
388	B.	L
ε		L
431	B.	L
13	B.	V
64	B.	V
q		V
370	B.	V
75		V
83		V
85		V
214	G.	V
43	H.	V
231	G.	V
236	G.	V
9	G.	L
17	G.	L
18	G.	L
43	B.	L
47	G.	L
64	G.	L
253	B.	S
266	B.	S
f		S
57		S
31	B.	C
27	G.	C
47	B.	C
τ		C
61	B.	C
95	B.	Ca

EMENTS FOR THE OF OCCULTATIONS.

ELEMENTS FOR THE OF OCCULTATIC

OCCULTATIONS VISIBLE AT WASHINGTON.

—The angles of position are counted from the north point and vertex of the Moon's limb toward the east.
[illegible]mersion below the horizon of Washington. ‡ Emersion below the horizon of Washington.

OCCULTATIONS VISIBLE AT WASHINGTON.

Date.	The Star's		Immersion.				Emersion.		
			Washington.		Angle from—		Washington.		Ang from
	Name.	Mag.	Sidereal Time.	Mean Time.	North Point.	Vertex.	Sidereal Time.	Mean Time.	North Point.
			h m	h m	°	°	h m	h m	°
June 11	22 B. Piscium	6.4	17 28	12 8	103	154	18 13	12 53	204
11	9 Piscium	6.4	19 41	14 21	35	81	20 44	15 23	261
11	κ Piscium	4.9	20 5	14 45	341	25	20 20	15 0	316
15	47 Arietis	5.8	20 10	14 34	51	101	21 0	15 24	270
25	p^3 Leonis	6.1	14 20	8 6	120	76	15 32	9 18	301
26	13 B. Virginis ‡	5.9	17 2	10 43	56	6	17 36	11 17	351
July 1	50 B. Scorpii	6.4	15 56	9 18	26	27	16 20	9 41	354
3	70 B. Sagittarii	6.4	22 13	15 26	154	112	22 24	15 36	173
4	222 B. Sagittarii	5.5	19 38	12 48	80	75	20 53	14 2	238
4	50 Sagittarii	5.5	22 47	15 56	66	27	23 49	16 57	249
27	18 G. Libræ ‡	6.1	19 16	10 55	59	13	20 7	11 46	317
Aug. 5	16 Piscium	5.7	17 43	8 47	26	77	18 27	9 30	282
5	19 Piscium	5.4	23 16	14 19	53	62	0 32	15 34	235
6	136 B. Piscium	6.5	23 32	14 30	95	119	0 31	15 30	196
7	101 Piscium	6.2	23 35	14 30	94	136	0 38	15 33	203
10	62 Tauri	6.1	0 30	15 13	19	78	1 9	15 52	311
12	8 Geminorum	6.1	1 26	16 1	27	84	1 59	16 34	329
12	9 Geminorum	6.2	1 26	16 2	91	149	2 38	17 13	266
28	222 B. Sagittarii	5.5	20 18	9 51	116	102	21 8	10 41	200
28	50 Sagittarii ‡	5.5	23 18	12 51	99	56	0 9	13 42	217
30	72 B. Aquarii	6.5	1 37	15 2	342	297	1 50	15 14	319
Sept. 1	κ Piscium	4.9	4 2	17 18	98	48	4 49	18 5	210
4	20 H^1. Arietis	6.4	0 28	13 32	109	149	1 21	14 26	195
6	33 Tauri	6.0	21 26	10 24	6	58	21 46	10 43	323
6	161 B. Tauri	6.5	22 41	11 38	68	124	23 43	12 40	258
7	99 Tauri	6.0	22 54	11 47	148	202	23 16	12 9	191
23	63 Ophiuchi	6.1	19 47	7 38	54	30	20 57	8 48	282
24	154 B. Sagittarii	5.9	20 38	8 24	87	64	21 48	9 35	233
26	95 B. Capricorni	5.9	0 20	11 58	42	2	1 19	12 57	260
29	16 Piscium	5.7	18 46	6 13	356	46	19 9	6 37	309
29	19 Piscium	5.4	0 17	11 44	44	33	1 29	12 56	247
30	136 B. Piscium	6.5	23 22	10 44	42	68	0 33	11 56	251
Oct. 4	95 Tauri	6.2	3 30	14 36	85	126	4 57	16 3	262
5	121 Tauri	5.1	0 27	11 30	72	129	1 31	12 34	275
7	56 Geminorum †	5.2	0 0	10 55	122	170	0 49	11 44	247
7	61 Geminorum	5.8	2 27	13 22	142	198	3 16	14 11	232
21	24 Sagittarii	5.7	18 52	4 53	141	136	19 26	5 27	190
21	117 B. Sagittarii	5.8	21 25	7 26	83	50	22 32	8 33	240
23	47 B. Capricorni	6.2	23 5	8 57	87	55	0 5	9 57	216
24	72 B. Aquarii	6.5	22 0	7 49	16	7	22 58	8 47	279
26	κ Piscium	4.9	4 27	14 7	149	99	4 32	14 12	160
29	20 H^1. Arietis	6.4	0 47	10 15	64	98	2 4	11 33	243
Nov. 2	1 Geminorum	4.3	23 36	8 49	81	133	0 34	9 46	273
2	3 Geminorum	5.6	2 19	11 32	130	188	3 17	12 29	229
3	120 B. Geminorum	6.5	5 27	14 35	69	115	6 41	15 49	320
10	q Virginis †	5.3	6 54	15 35	110	162	7 57	16 37	305
24	136 B. Piscium	6.5	20 45	4 32	32	82	21 43	5 30	267
27	32 Tauri	5.8	9 56	17 29	144	91	10 28	18 0	216

NOTE.—The angles of position are counted from the north point and vertex of the Moon's limb towa

† Immersion below the horizon of Washington. ‡ Emersion below the horizon of Wash

OCCULTATIONS VISIBLE AT WASHINGTON.

THE STAR'S		IMMERSION.				EMERSION.				Duration of Occultation.
		Washington.		Angle from—		Washington.		Angle from—		
Name.	Mag.	Sidereal Time.	Mean Time.	North Point.	Vertex.	Sidereal Time.	Mean Time.	North Point.	Vertex.	
		h m	h m	°	°	h m	h m	°	°	h m
284 B. Tauri	6.0	23 8	6 38	114	170	23 56	7 27	221	278	0 48
300 B. Tauri	6.2	4 15	11 45	154	172	4 47	12 17	197	193	0 31
d Geminorum	5.2	9 56	17 17	66	10	10 46	18 8	333	276	0 50
g Geminorum	5.0	10 56	18 13	135	81	12 1	19 18	274	218	1 5
222 B. Cancri	6.3	6 22	13 32	120	168	7 47	14 57	294	327	1 25
237 B. Leonis	6.3	11 23	18 24	162	151	12 35	19 36	271	241	1 11
e Leonis	5.1	7 9	14 7	182	230	7 41	14 39	237	283	0 32
101 Piscium	6.2	7 23	13 18	103	51	8 12	14 7	228	178	0 49
ζ Arietis	5.0	23 30	5 18	87	144	0 36	6 25	230	283	1 7
3 Geminorum	5.6	23 58	5 34	69	122	0 54	6 30	286	343	0 56
6 Geminorum	6.3	1 9	6 45	120	177	2 6	7 42	237	295	0 57
μ Geminorum	3.2	8 3	13 39	178	130	8 27	14 3	212	160	0 24

—The angles of position are counted from the north point and vertex of the Moon's limb toward the east.

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE SU

FOR GREENWICH MEAN NOON.

Date.	P	B_0	L_0	Date.	P	B_0
	°	°	°		°	°
Jan. 1	+ 1.99	−3.16	162.77	July 5	− 0.88	+3.42
6	− 0.44	3.73	96.92	10	+ 1.39	3.94
11	2.86	4.27	31.07	15	3.64	4.43
16	5.23	4.77	325.24	20	5.85	4.90
21	7.54	5.24	259.40	25	8.00	5.32
26	− 9.76	−5.66	193.57	30	+10.07	+5.72
31	11.89	6.04	127.74	Aug. 4	12.06	6.07
Feb. 5	13.90	6.37	61.90	9	13.96	6.38
10	15.79	6.65	356.07	14	15.75	6.64
15	17.54	6.88	290.23	19	17.42	6.86
20	−19.15	−7.05	224.39	24	+18.98	+7.04
25	20.62	7.17	158.54	29	20.40	7.16
Mar. 2	21.93	7.24	92.67	Sept. 3	21.69	7.23
7	23.08	7.25	26.80	8	22.84	7.25
12	24.07	7.20	320.91	13	23.84	7.22
17	−24.89	−7.10	255.00	18	+24.68	+7.13
22	25.54	6.94	189.08	23	25.37	6.99
27	26.01	6.74	123.15	28	25.89	6.80
Apr. 1	26.31	6.48	57.19	Oct. 3	26.24	6.56
6	26.43	6.18	351.21	8	26.41	6.27
11	−26.36	−5.83	285.21	13	+26.40	+5.94
16	26.11	5.44	219.19	18	26.20	5.55
21	25.68	5.01	153.16	23	25.81	5.13
26	25.06	4.55	87.10	28	25.23	4.66
May 1	24.26	4.06	21.02	Nov. 2	24.45	4.16
6	−23.28	−3.53	314.93	7	+23.47	+3.63
11	22.13	2.99	248.81	12	22.29	3.07
16	20.80	2.42	182.69	17	20.93	2.48
21	19.31	1.84	116.55	22	19.38	1.87
26	17.67	1.25	50.39	27	17.65	1.25
31	−15.88	−0.65	344.23	Dec. 2	+15.76	+0.61
June 5	13.98	−0.05	278.06	7	13.73	−0.03
10	11.96	+0.55	211.88	12	11.56	0.67
15	9.85	1.15	145.69	17	9.30	1.29
20	7.66	1.74	79.51	22	6.95	1.93
25	− 5.43	+2.32	13.33	27	+ 4.55	−2.54
30	− 3.16	+2.88	307.14	32	+ 2.11	−3.13

In the above table, P is the position-angle of the axis of rotation measured eastw the north point of the disk, while L_0 and B_0 are the heliographic longitudes and latitude tively, of the center of the disk. The longitudes are reckoned from the Solar Meridi *passed through the* ascending node of the Sun's equator on the ecliptic, on January 1, 185 *vich Mean Noon.*

MEAN EQUATOR, ORBIT, AND MEAN LONGITUDE.

FOR GREENWICH MEAN NOON.

Daily motion of Γ' . . . . . . $+6'.684$
Daily motion of ☊ . . . . . . $-3'.177$

EPHEMERIS FOR OBSER OF THE MO

FOR MEAN .

	31	+6.76	−4.81	−0.01	+0.01	16.33	+0.60
Feb.	1	5.83	3.68	0.01	0.01	28.48	[illegible]
	2	4.68	2.40	0.01	0.01	40.63	0.66
	3	3.38	−1.04	0.01	0.01	52.77	0.69
	4	2.01	+0.37	0.01	0.02	64.91	0.72
	5	+0.60	+1.75	−0.01	+0.02	77.05	+0.75
	6	−0.80	3.05	0.01	[illegible]	89.18	0.77
	7	2.14	4.23	0.01	0.02	101.32	0.80
	8	3.40	5.23	0.02	0.02	113.46	0.82
	9	4.55	6.01	0.02	0.02	125.59	0.84
	10	−5.55	+6.52	−0.02	+0.02	137.73	+0.86
	11	6.37	6.74	0.02	0.02	149.88	0.88
	12	6.98	6.65	0.02	0.02	162.03	0.90
	13	7.33	6.23	0.02	0.02	174.19	0.92
	14	7.38	5.46	0.02	0.02	186.36	0.93
	15	−7.10	+4.41	−0.02	+0.02	198.53	+0.95
	16	−6.44	+3.06	−0.02	+0.02	210.71	+0.97

HEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOON.

FOR MEAN MIDNIGHT.

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EPHEMERIS FOR OBSER OF THE MOO

FOR MEAN

HEMERIS FOR OF THE MOON.

FOR MEAN

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EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOO

FOR GREENWICH MEAN

Date.				
July	1			13
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	12			4
	13			4
	14			4
	15			5
	16			5
	17			
	18			
	19			1
	20			1
	21			1
	22			2
	23	3.56	6.53	2
	24	4.74	6.79	2
	25	5.78	6.76	2
	26	−6.59	+6.41	2
	27	7.11	5.75	1
	28	7.30	4.78	1
	29	7.08	3.53	1
	30	6.44	2.04	
	31	−5.36	+0.38	35
Aug.	1	3.88	−1.35	35
	2	2.09	3.02	34
	3	−0.10	4.49	34
	4	+1.92	5.64	33
	5	+3.79	−6.39	33
	6	5.39	6.70	33
	7	6.60	6.57	33
	8	7.37	6.05	33
	9	7.68	5.21	34
	10	+7.58	−4.11	34
	11	7.11	2.84	35
	12	6.34	1.46	35
	13	5.35	−0.03	
	14	4.20	+1.38	
	15	+2.93	+2.71	
	16	+1.61	+3.92	

HEMERIS FOR OF THE MOON.

FOR MEAN

[illegible]

Colong.	Lat.	C
°	°	°
259.98	−1.12	15.64
272.23	1.13	18.73
284.47	1.15	21.06
296.71	1.16	22.65
308.95	1.17	23.39
321.19	−1.18	23.21
333.42	1.19	22.05
345.64	1.20	19.81
357.86	1.21	16.45
10.07	1.22	12.02
22.27	−1.23	6.70
34.47	1.24	0.81
46.66	1.26	354.82
58.84	1.28	349.18
71.02	1.30	344.30
83.20	−1.31	340.46
95.37	1.33	337.86
107.55	1.35	336.62
119.72	1.37	336.83
131.90	1.38	338.49
144.09	−1.40	341.49
156.28	1.42	345.62
168.48	1.43	350.54
180.68	1.44	355.86
192.89	1.46	1.20
205.10	−1.47	6.25
217.32	1.48	10.82
229.55	1.49	14.78
241.77	1.50	18.05
254.00	1.51	20.60
266.23	−1.51	22.38
278.46	1.52	23.33
290.69	1.52	23.38
302.92	1.52	22.44
315.14	1.52	20.45
327.36	−1.52	17.37
339.57	1.51	13.25
351.78	1.51	8.24
3.98	1.51	2.63
16.17	1.51	356.81
28.36	−1.51	351.18
40.53	1.51	346.13
52.70	1.51	341.94
64.87	1.51	338.82
77.03	1.51	336.97
89.19	−1.51	336.52
101.35	−1.52	337.56

EPHEMERIS FOR PHYSICAL OF THE MO

FOR MEAN

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'HEMERIS FOR OBSER OF THE MOON.

FOR MEAN

L.
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FOR GREENWICH MEAN NOON.

Date.		k	i	θ	L	Stellar Mag.	Date.		k	i	θ	L
			°	°						°	°	
Jan.	1	0.650	72	352	59.1	−0.4	July	5	0.934	30	185	67.5
	6	0.451	96	347	61.5	−0.1		10	0.993	9	212	65.6
	11	0.212	125	342	41.8	+0.8		15	0.990	12	344	57.8
	16	0.035	158	324	8.4	2.1		20	0.947	27	3	48.7
	21	0.026	161	204	6.0	2.3		25	0.888	39	11	41.5
	26	0.158	133	184	27.6	+1.2		30	0.827	49	16	36.1
	31	0.322	110	178	39.5	0.7	Aug.	4	0.766	58	19	33.0
Feb.	5	0.464	94	175	40.3	0.4		9	0.707	66	22	31.4
	10	0.573	82	171	37.1	0.2		14	0.646	73	24	30.9
	15	0.656	72	168	33.5	0.2		19	0.580	81	26	31.2
	20	0.721	64	164	30.8	+0.1		24	0.504	90	28	32.1
	25	0.775	57	160	29.2	0.0		29	0.415	100	30	32.7
Mar.	2	0.821	50	157	28.6	−0.1	Sept.	3	0.309	112	32	31.4
	7	0.862	44	153	29.1	0.2		8	0.188	129	36	25.2
	12	0.901	37	150	31.0	0.4		13	0.071	149	44	12.9
	17	0.939	29	146	34.4	−0.7		18	0.006	171	96	1.3
	22	0.972	19	142	39.9	1.0		23	0.056	153	192	11.5
	27	0.996	7	125	47.9	1.5		28	0.228	123	203	40.0
Apr.	1	0.994	9	351	58.0	1.6	Oct.	3	0.464	94	207	63.2
	6	0.943	28	337	67.4	1.4		8	0.681	69	209	66.5
	11	0.826	49	336	70.3	−1.1		13	0.835	48	211	57.8
	16	0.663	71	336	64.4	−0.6		18	0.925	32	212	46.8
	21	0.489	91	337	53.0	0.0		23	0.971	20	213	38.0
	26	0.330	110	338	40.0	+0.6		28	0.993	10	214	31.9
May	1	0.198	127	339	27.2	1.2	Nov.	2	1.000	2	225	28.0
	6	0.094	144	340	14.6	+1.9		7	0.998	5	21	25.0
	11	0.026	162	342	4.4	2.6		12	0.991	11	22	24.0
	16	0.000	178	40	0.0	3.5		17	0.978	17	20	24.7
	21	0.020	164	149	3.3	2.8		22	0.959	23	17	25.9
	26	0.075	148	152	11.2	2.1		27	0.932	30	14	28.4
	31	0.154	134	154	19.8	+1.6	Dec.	2	0.893	38	10	32.4
June	5	0.243	121	156	27.0	1.2		7	0.834	48	6	38.5
	10	0.340	109	158	33.0	0.8		12	0.745	61	2	46.7
	15	0.446	96	161	38.8	+0.5		17	0.608	78	358	55.3
	20	0.562	83	165	45.6	0.0		22	0.412	100	354	57.0
	25	0.691	68	169	53.7	−0.4		27	0.181	130	350	36.7
	30	0.824	50	176	62.3	−0.9		32	0.019	164	328	4.9

NOTATION.

k=the ratio of the area of the illuminated portion of the apparent disk to the area of apparent disk regarded as circular.

i=the angle between the Sun and Earth, as seen from the planet.

θ=the angle which the line joining the cusps, or extremities of the illuminated porti with the meridian.

L=the brilliancy of the disk. The unit of L is the amount of light received by an circular disk with the same albedo as the planet, subtending an angular rad second of arc, situated at distance unity from the Sun, and illuminated by as the mean disk of the planet is illuminated.

FOR GREENWICH MEAN NOON.

te.	k	i	θ	L	Stellar Mag.	Date.	k	i	θ	L	Stellar Mag.
		°	°					°	°		
1	0.885	39.6	189.5	61.0	−3.4	July 5	0.945	27.2	8.7	52.2	−3.3
6	0.895	37.8	186.7	59.5	3.4	10	0.936	29.2	10.9	52.9	3.3
11	0.904	36.0	183.7	58.2	3.4	15	0.927	31.2	12.9	53.8	3.3
16	0.913	34.3	180.6	57.0	3.4	20	0.918	33.2	14.8	54.8	3.3
21	0.921	32.5	177.5	55.8	3.4	25	0.908	35.3	16.4	55.8	3.3
26	0.929	30.9	174.3	54.7	−3.4	30	0.898	37.3	17.9	56.9	−3.3
31	0.937	29.2	171.2	53.7	3.3	Aug. 4	0.887	39.3	19.2	58.1	3.3
. 5	0.944	27.5	168.1	52.8	3.3	9	0.876	41.2	20.2	59.4	3.4
10	0.950	25.8	165.2	51.9	3.3	14	0.864	43.2	21.1	60.8	3.4
15	0.956	24.1	162.4	51.2	3.3	19	0.852	45.2	21.7	62.3	3.4
20	0.962	22.4	159.8	50.5	−3.3	24	0.840	47.1	22.1	64.0	−3.4
25	0.967	20.8	157.3	49.8	3.3	29	0.827	49.1	22.3	65.8	3.4
r. 2	0.972	19.2	155.0	49.2	3.4	Sept. 3	0.814	51.1	22.3	67.8	3.4
7	0.977	17.5	152.9	48.7	3.4	8	0.801	53.0	22.0	70.0	3.4
12	0.981	15.8	151.0	48.2	3.4	13	0.787	55.0	21.5	72.3	3.5
17	0.985	14.2	149.3	47.8	−3.4	18	0.773	57.0	20.8	74.8	−3.5
22	0.988	12.5	147.6	47.5	3.4	23	0.758	58.9	19.8	77.6	3.5
27	0.991	10.8	146.0	47.2	3.4	28	0.743	60.9	18.7	80.6	3.5
r. 1	0.994	9.1	144.2	47.0	3.4	Oct. 3	0.727	62.9	17.3	84.0	3.6
6	0.996	7.4	142.2	46.8	3.4	8	0.712	65.0	15.7	87.6	3.6
11	0.998	5.6	139.2	46.7	−3.4	13	0.695	67.0	13.9	91.5	−3.6
16	0.999	4.0	133.7	46.6	3.5	18	0.678	69.1	11.9	95.9	3.7
21	1.000	2.3	119.8	46.6	3.5	23	0.661	71.2	9.7	100.7	3.7
26	1.000	1.3	69.0	46.6	3.5	28	0.643	73.4	7.5	105.9	3.7
y 1	1.000	2.2	11.6	46.7	3.5	Nov. 2	0.624	75.7	5.1	111.7	3.8
6	0.999	3.8	356.2	46.8	−3.5	7	0.604	78.0	2.7	118.0	−3.8
11	0.998	5.6	351.5	47.0	3.4	12	0.584	80.4	0.3	125.0	3.9
16	0.996	7.5	350.0	47.2	3.4	17	0.562	82.9	357.9	132.5	3.9
21	0.993	9.4	350.2	47.5	3.4	22	0.539	85.5	355.6	140.8	4.0
26	0.990	11.3	351.2	47.8	3.4	27	0.515	88.2	353.3	149.8	4.0
31	0.987	13.3	352.7	48.2	−3.4	Dec. 2	0.490	91.1	351.2	159.4	−4.1
ne 5	0.983	15.2	354.6	48.6	3.4	7	0.463	94.2	349.2	169.9	4.2
10	0.978	17.2	356.8	49.0	3.4	12	0.434	97.6	347.4	180.8	4.2
15	0.972	19.2	359.2	49.6	3.4	17	0.404	101.1	345.7	192.0	4.3
20	0.966	21.2	1.6	50.1	3.4	22	0.370	105.1	344.1	202.5	4.3
25	0.960	23.2	4.0	50.7	−3.3	27	0.334	109.4	342.6	212.0	−4.4
30	0.953	25.2	6.4	51.4	−3.3	32	0.295	114.2	341.0	218.4	−4.4

NOTATION.

k=the ratio of the area of the illuminated portion of the apparent disk to the area of the entire apparent disk regarded as circular.

i=the angle between the Sun and Earth, as seen from the planet.

θ=the angle which the line joining the cusps, or extremities of the illuminated portion, makes with the meridian.

L=the brilliancy of the disk. The unit of L is the amount of light received by an eye from a circular disk with the same albedo as the planet, subtending an angular radius of one second of arc, situated at distance unity from the Sun, and illuminated by the latter as the mean disk of the planet is illuminated.

39398°—1917——40

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF MAR

FOR GREENWICH MEAN NOON.

Date.	Light-Time.	Stellar Magnitude.	P	$A_\oplus+180°$	$D_\oplus$	$A_\odot-A_\oplus$	$D_\odot$
	m		°	°	°	°	°
Oct. 1	15.98	+1.6	358.10	221.05	+16.95	−29.59	+ 5.05
3	15.87	1.6	358.84	222.25	17.29	29.92	5.43
5	15.76	1.6	359.57	223.45	17.63	30.24	5.80
7	15.64	1.6	0.30	224.64	17.95	30.57	6.18
9	15.52	1.6	1.02	225.84	18.26	30.89	6.55
11	15.41	+1.6	1.75	227.04	+18.57	−31.22	+ 6.91
13	15.29	1.6	2.46	228.23	18.86	31.54	7.28
15	15.16	1.5	3.18	229.42	19.15	31.86	7.64
17	15.04	1.5	3.88	230.60	19.42	32.18	8.00
19	14.92	1.5	4.59	231.79	19.69	32.50	8.36
21	14.79	+1.5	5.28	232.97	+19.94	−32.82	+ 8.71
23	14.66	1.5	5.98	234.15	20.18	33.13	9.07
25	14.53	1.5	6.66	235.32	20.42	33.43	9.42
27	14.40	1.5	7.34	236.49	20.64	33.74	9.76
29	14.27	1.4	8.02	237.65	20.85	34.04	10.10
31	14.13	+1.4	8.68	238.82	+21.05	−34.33	+10.44
Nov. 2	14.00	1.4	9.34	239.97	21.24	34.63	10.78
4	13.86	1.4	9.99	241.12	21.43	34.91	11.12
6	13.72	1.4	10.64	242.27	21.60	35.19	11.45
8	13.58	1.4	11.27	243.41	21.76	35.46	11.78
10	13.44	+1.3	11.90	244.54	+21.91	−35.73	+12.10
12	13.30	1.3	12.52	245.66	22.05	35.98	12.42
14	13.15	1.3	13.13	246.78	22.18	36.23	12.74
16	13.00	1.3	13.73	247.88	22.30	36.47	13.05
18	12.86	1.3	14.32	248.98	22.41	36.70	13.36
20	12.71	+1.2	14.91	250.07	+22.51	−36.92	+13.67
22	12.56	1.2	15.48	251.14	22.60	37.12	13.98
24	12.41	1.2	16.04	252.21	22.68	37.32	14.28
26	12.26	1.2	16.59	253.26	22.76	37.50	14.57
28	12.11	1.1	17.13	254.30	22.82	37.66	14.87
30	11.95	+1.1	17.66	255.33	+22.87	−37.82	+15.16
Dec. 2	11.80	1.1	18.17	256.34	22.92	37.95	15.44
4	11.65	1.1	18.68	257.34	22.96	38.08	15.72
6	11.49	1.0	19.17	258.33	22.98	38.18	16.00
8	11.33	1.0	19.65	259.30	23.00	38.27	16.28
10	11.19	+1.0	20.12	260.25	+23.02	−38.34	+16.55
12	11.02	1.0	20.57	261.18	23.02	38.39	16.81
14	10.86	0.9	20.91	262.10	23.02	38.42	17.07
16	10.70	0.9	21.44	262.99	23.01	38.43	17.33
18	10.55	0.8	21.85	263.86	22.99	38.42	17.59
20	10.39	+0.8	22.25	264.71	+22.97	−38.38	+17.84
22	10.23	0.8	22.63	265.54	22.94	38.32	18.08
24	10.07	0.8	23.00	266.34	22.91	38.23	18.32
26	9.91	0.7	23.36	267.12	22.87	38.12	18.56
28	9.75	0.7	23.70	267.88	22.83	37.98	18.79
30	*9.60*	+0.6	24.02	268.61	+22.78	−37.81	+19.02
32	*9.44*	+0.6	24.33	269.31	+22.73	−37.62	+19.2

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF MARS.

FOR GREENWICH MEAN NOON.

te.	k	Diameter.	i	q	Q	Central Meridian.	Mean Time of Transit of Zero Meridian. Of Date.	Of Intermediate Date.
		"	°	"	°	°	h m	h m
1	0.927	5.25	31.32	0.38	287.00	288.41	4 54.3	5 34.1
3	0.926	5.29	31.57	0.39	287.35	269.03	6 14.0	6 53.8
5	0.925	5.33	31.82	0.40	287.69	249.64	7 33.6	8 13.5
7	0.924	5.37	32.06	0.41	288.00	230.26	8 53.3	9 33.2
9	0.923	5.41	32.29	0.42	288.33	210.87	10 13.0	10 52.8
11	0.922	5.45	32.53	0.43	288.64	191.49	11 32.7	12 12.5
13	0.920	5.49	32.76	0.44	288.94	172.11	12 52.3	13 32.2
15	0.919	5.53	32.98	0.45	289.22	152.74	14 12.0	14 51.8
17	0.918	5.58	33.20	0.46	289.50	133.36	15 31.6	16 11.4
19	0.917	5.63	33.42	0.47	289.76	113.99	16 51.2	17 31.0
21	0.916	5.68	33.63	0.48	290.02	94.63	18 10.8	18 50.6
23	0.915	5.72	33.84	0.49	290.26	75.26	19 30.4	20 10.2
25	0.914	5.78	34.04	0.50	290.50	55.91	20 50.0	21 29.7
27	0.913	5.83	34.24	0.50	290.72	36.56	22 9.5	22 49.3
29	0.912	5.88	34.43	0.51	290.94	17.21	23 29.0	. . . . .
31	0.911	5.94	34.61	0.52	291.14	357.86	0 8.8	0 48.6
2	0.911	6.00	34.79	0.54	291.33	338.52	1 28.3	2 8.0
4	0.910	6.06	34.97	0.55	291.52	319.19	2 47.8	3 27.5
6	0.909	6.12	35.14	0.56	291.69	299.86	4 7.2	4 46.9
8	0.908	6.18	35.30	0.57	291.85	280.54	5 26.6	6 6.3
10	0.907	6.25	35.45	0.58	292.00	261.23	6 46.0	7 25.6
12	0.907	6.31	35.59	0.59	292.15	241.92	8 5.3	8 45.0
14	0.906	6.38	35.73	0.60	292.28	222.62	9 24.6	10 4.3
16	0.905	6.45	35.86	0.61	292.40	203.34	10 43.9	11 23.5
18	0.905	6.53	35.97	0.62	292.52	184.06	12 3.1	12 42.7
20	0.904	6.60	36.08	0.63	292.62	164.80	13 22.3	14 1.8
22	0.904	6.68	36.18	0.64	292.72	145.54	14 41.4	15 21.0
24	0.903	6.76	36.27	0.65	292.81	126.30	16 0.5	16 40.0
26	0.903	6.85	36.35	0.67	292.88	107.06	17 19.5	17 59.0
28	0.902	6.93	36.42	0.68	292.95	87.85	18 38.5	19 17.9
30	0.902	7.02	36.47	0.69	293.01	68.64	19 57.4	20 36.8
2	0.902	7.11	36.51	0.70	293.06	49.45	21 16.2	21 55.6
4	0.902	7.21	36.54	0.71	293.10	30.27	22 35.0	23 14.4
6	0.902	7.30	36.56	0.72	293.14	11.11	23 53.7	. . . . .
8	0.902	7.40	36.56	0.73	293.16	351.96	0 33.0	1 12.4
10	0.902	7.51	36.55	0.74	293.18	332.83	1 51.6	2 30.9
12	0.902	7.62	36.52	0.75	293.19	313.72	3 10.2	3 49.4
14	0.902	7.73	36.48	0.76	293.19	294.63	4 28.6	5 7.8
16	0.902	7.84	36.42	0.76	293.18	275.56	5 47.0	6 26.1
18	0.903	7.96	36.34	0.77	293.17	256.51	7 5.2	7 44.3
20	0.903	8.08	36.24	0.78	293.14	237.48	8 23.4	9 2.4
22	0.904	8.20	36.12	0.79	293.11	218.47	9 41.4	10 20.4
24	0.905	8.33	35.98	0.80	293.07	199.49	10 59.4	11 38.4
26	0.905	8.47	35.82	0.80	293.03	180.53	12 17.3	12 56.2
28	0.906	8.60	35.64	0.81	292.97	161.60	13 35.0	14 13.9
30	*0.907*	*8.74*	*35.43*	0.81	292.91	142.70	14 52.7	15 31.4
32	*0.909*	*8.89*	*35.20*	0.81	292.84	123.82	16 10.1	. . . . .

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF JUPITER

FOR GREENWICH MEAN NOON.

Date.		Light-Time.	Stellar Magnitude.	P	$A_{\oplus}+180°$	$D_{\oplus}$	$A_{\odot}+180°$
		m		°	°	°	°
Jan.	1	38.42	−2.1	337.30	249.92	+2.88	260.94
	8	39.34	2.1	337.37	250.28	2.85	261.58
	15	40.27	2.0	337.47	250.80	2.83	262.21
	22	41.20	2.0	337.60	251.46	2.81	262.85
	29	42.13	1.9	337.77	252.27	2.80	263.48
Feb.	5	43.03	−1.9	337.96	253.20	+2.79	264.12
	12	43.91	1.8	338.19	254.24	2.79	264.76
	19	44.75	1.8	338.45	255.39	2.79	265.39
	26	45.55	1.8	338.73	256.64	2.79	266.02
Mar.	5	46.29	1.7	339.05	257.96	2.79	266.66
	12	46.98	−1.7	339.40	259.36	+2.80	267.29
	19	47.60	1.7	339.78	260.82	2.81	267.93
	26	48.15	1.6	340.18	262.33	2.82	268.56
Apr.	2	48.64	1.6	340.61	263.89	2.83	269.20
	9	49.04	1.6	341.07	265.48	2.85	269.83
June	5	49.39	−1.6	345.51	278.88	+2.94	274.97
	12	49.07	1.6	346.10	280.48	2.95	275.60
	19	48.68	1.6	346.69	282.04	2.95	276.23
	26	48.22	1.6	347.28	283.56	2.96	276.86
July	3	47.69	1.6	347.87	285.03	2.97	277.49
	10	47.10	−1.7	348.43	286.45	+2.98	278.12
	17	46.45	1.7	348.98	287.80	2.98	278.74
	24	45.74	1.7	349.51	289.08	2.99	279.37
	31	44.99	1.8	350.01	290.28	2.99	280.00
Aug.	7	44.19	1.8	350.48	291.39	3.00	280.62
	14	43.36	−1.8	350.91	292.40	+3.01	281.25
	21	42.50	1.9	351.30	293.30	3.01	281.87
	28	41.63	1.9	351.63	294.07	3.02	282.50
Sept.	4	40.74	2.0	351.92	294.72	3.02	283.12
	11	39.86	2.0	352.14	295.23	3.03	283.75
	18	38.99	−2.1	352.29	295.59	+3.04	284.37
	25	38.14	2.1	352.38	295.79	3.05	284.99
Oct.	2	37.33	2.2	352.40	295.83	3.05	285.62
	9	36.57	2.2	352.35	295.70	3.06	286.24
	16	35.88	2.2	352.22	295.41	3.07	286.86
	23	35.26	−2.3	352.02	294.96	+3.07	287.48
	30	34.73	2.3	351.77	294.37	3.07	288.10
Nov.	6	34.31	2.3	351.46	293.65	3.07	288.72
	13	33.99	2.4	351.10	292.82	3.07	289.34
	20	33.80	2.4	350.71	291.92	3.06	289.96
	27	33.73	−2.4	350.31	290.97	+3.05	290.58
Dec.	4	33.79	2.4	349.91	290.02	3.03	291.20
	11	33.98	2.4	349.52	289.10	3.01	291.82
	18	34.29	2.3	349.16	288.23	2.99	292.43
	25	34.71	2.3	348.85	287.47	2.96	293.05
	32	35.25	−2.3	348.59	286.82	+2.94	293.67

HEMERIS FOR PHYSICAL OBSERVATIONS OF JUPITER.

FOR GREENWICH MEAN NOON.

	Equatorial Diameter.	Excess of Equat. Diameter over Polar.	i	q	Q	Central Meridian.		Correction for Phase.
						System I.	System II.	
	″	″	°	″	°	°	°	°
1	43.34	2.62	11.00	0.40	68.38	16.63	176.53	−0.53
8	42.34	2.56	11.28	0.41	68.60	41.01	147.51	0.55
15	41.36	2.50	11.40	0.41	68.82	65.22	118.32	0.56
22	40.42	2.45	11.37	0.40	69.07	89.29	88.98	0.56
29	39.53	2.39	11.20	0.38	69.33	113.22	59.51	0.55
5	38.70	2.34	10.91	0.35	69.62	137.04	29.92	−0.52
12	37.92	2.29	10.50	0.32	69.93	160.76	0.23	0.48
19	37.21	2.25	10.00	0.28	70.27	184.39	330.46	0.44
26	36.56	2.21	9.39	0.25	70.65	207.97	300.63	0.38
5	35.97	2.18	8.69	0.21	71.07	231.49	270.75	0.33
12	35.45	2.15	7.93	0.17	71.53	254.97	240.82	−0.27
19	34.98	2.12	7.10	0.13	72.06	278.43	210.88	0.22
26	34.58	2.09	6.23	0.10	72.64	301.88	180.92	0.17
2	34.24	2.07	5.31	0.07	73.32	325.33	150.96	0.12
9	33.96	2.05	4.35	0.05	74.19	348.79	121.02	−0.08
5	33.71	2.04	3.91	0.04	253.63	335.48	32.79	+0.07
12	33.93	2.05	4.87	0.06	254.68	359.38	3.28	0.10
19	34.20	2.07	5.80	0.09	255.57	23.35	333.84	0.15
26	34.53	2.09	6.69	0.12	256.37	47.41	304.49	0.20
3	34.92	2.11	7.53	0.15	257.11	71.57	275.23	0.25
10	35.36	2.14	8.32	0.19	257.79	95.81	246.06	+0.30
17	35.85	2.17	9.04	0.23	258.43	120.16	217.00	0.36
24	36.41	2.20	9.70	0.26	259.02	144.61	188.03	0.41
31	37.02	2.24	10.27	0.30	259.58	169.17	159.18	0.46
7	37.68	2.28	10.75	0.33	260.11	193.84	130.44	0.50
14	38.40	2.32	11.13	0.36	260.59	218.64	101.82	+0.54
21	39.18	2.37	11.40	0.39	261.03	243.57	73.33	0.56
28	40.00	2.42	11.56	0.41	261.43	268.62	44.98	0.58
4	40.87	2.47	11.58	0.42	261.79	293.81	16.75	0.58
11	41.78	2.53	11.47	0.42	262.08	319.14	348.67	0.57
18	42.71	2.58	11.20	0.41	262.33	344.62	320.73	+0.54
25	43.66	2.64	10.78	0.38	262.53	10.23	292.93	0.50
2	44.60	2.70	10.19	0.35	262.68	35.99	265.27	0.45
9	45.53	2.75	9.45	0.31	262.79	61.88	237.74	0.39
16	46.41	2.81	8.54	0.26	262.86	87.89	210.34	0.32
23	47.22	2.86	7.47	0.20	262.92	114.01	183.05	+0.24
30	47.94	2.90	6.26	0.14	263.02	140.23	155.85	0.17
6	48.54	2.94	4.92	0.09	263.24	166.50	128.72	0.10
13	48.99	2.96	3.47	0.04	263.85	192.82	101.63	0.05
20	49.27	2.98	1.96	0.01	265.76	219.15	74.54	+0.02
27	49.37	2.99	0.43	0.00	284.11	245.44	47.42	0.00
4	49.28	2.98	1.19	0.01	71.73	271.65	20.22	−0.01
11	49.01	2.97	2.71	0.03	76.18	297.76	352.93	0.03
18	48.57	2.94	4.20	0.06	77.20	323.74	325.49	0.08
25	47.97	2.90	5.58	0.11	77.58	349.54	297.89	0.14
32	47.24	2.86	6.83	0.17	77.73	15.16	270.10	−0.20

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF JUPITER, SYSTEM I.

GREENWICH MEAN TIME.

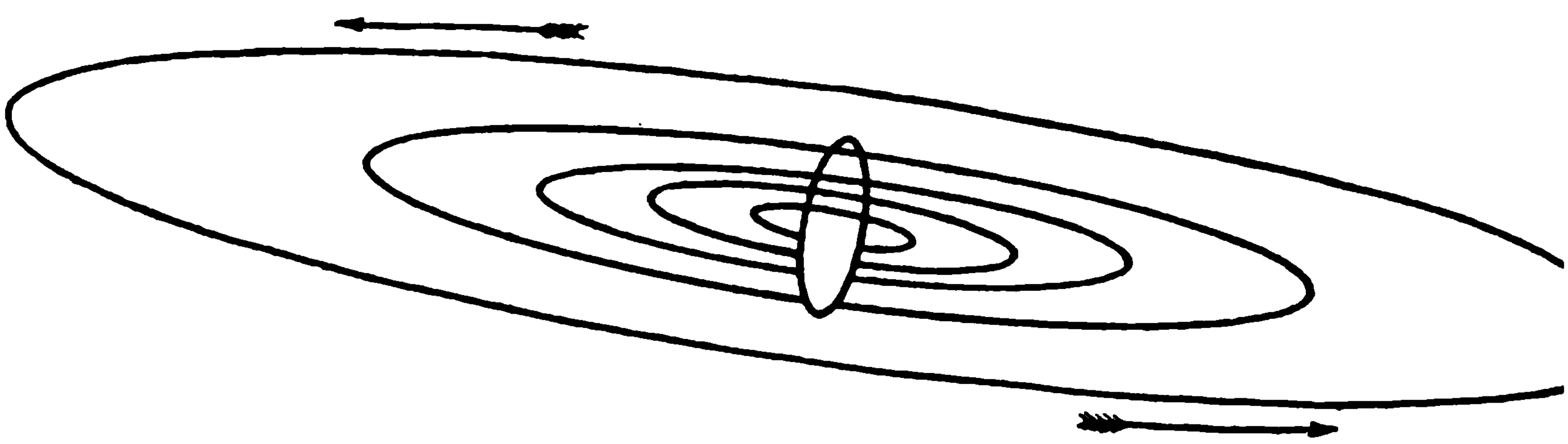
	Transit of Zero Meridian.	Interval between Successive Transits.		Transit of Zero Meridian.	Interval between Successive Transits.		Transit of Zero Meridian.	Interval between Successive Transits.
	d h m	h m		d h m	h m		d h m	h
Jan.	1 9 24.17	9 50.59	June	5 0 40.13	9 50.63	Sept.	19 15 46.25	9
	3 10 37.10			7 1 53.30			21 16 58.63	
	5 11 50.05			9 3 6.45			23 18 10.99	
	7 13 3.03			11 4 19.60			25 19 23.33	
	9 14 16.03			13 5 32.74			27 20 35.65	
	11 15 29.05	9 50.61		15 6 45.86	9 50.62		29 21 47.95	9
	13 16 42.09			17 7 58.97		Oct.	1 23 0.24	
	15 17 55.15			19 9 12.07			4 0 12.50	
	17 19 8.22			21 10 25.15			6 1 24.75	
	19 20 21.32			23 11 38.22			8 2 36.99	
	21 21 34.43	9 50.63		25 12 51.28	9 50.61		10 3 49.21	9
	23 22 47.56			27 14 4.33			12 5 1.41	
	26 0 0.71			29 15 17.36			14 6 13.60	
	28 1 13.87		July	1 16 30.38			16 7 25.76	
	30 2 27.05			3 17 43.39			18 8 37.92	
Feb.	1 3 40.24	9 50.64		5 18 56.38	9 50.59		20 9 50.06	9
	3 4 53.44			7 20 9.36			22 11 2.19	
	5 6 6.66			9 21 22.33			24 12 14.30	
	7 7 19.89			11 22 35.28			26 13 26.40	
	9 8 33.13			13 23 48.21			28 14 38.50	
	11 9 46.39	9 50.65		16 1 1.13	9 50.58		30 15 50.57	9
	13 10 59.65			18 2 14.04		Nov.	1 17 2.64	
	15 12 12.92			20 3 26.93			3 18 14.70	
	17 13 26.20			22 4 39.82			5 19 26.75	
	19 14 39.49			24 5 52.68			7 20 38.80	
	21 15 52.79	9 50.66		26 7 5.52	9 50.56		9 21 50.84	9
	23 17 6.10			28 8 18.36			11 23 2.87	
	25 18 19.41			30 9 31.18			14 0 14.89	
	27 19 32.73		Aug.	1 10 43.98			16 1 26.92	
Mar.	1 20 46.06			3 11 56.77			18 2 38.94	
	3 21 59.39	9 50.67		5 13 9.54	9 50.55		20 3 50.97	9
	5 23 12.73			7 14 22.29			22 5 3.00	
	8 0 26.07			9 15 35.03			24 6 15.03	
	10 1 39.42			11 16 47.75			26 7 27.07	
	12 2 52.77			13 18 0.46			28 8 39.12	
	14 4 6.13	9 50.67		15 19 13.15	9 50.53		30 9 51.17	9
	16 5 19.48			17 20 25.82		Dec.	2 11 3.24	
	18 6 32.84			19 21 38.48			4 12 15.32	
	20 7 46.21			21 22 51.12			6 13 27.43	
	22 8 59.57			24 0 3.74			8 14 39.55	
	24 10 12.94	9 50.67		26 1 16.35	9 50.51		10 15 51.69	9
	26 11 26.31			28 2 28.94			12 17 3.86	
	28 12 39.67			30 3 41.51			14 18 16.05	
	30 13 53.04		Sept.	1 4 54.06			16 19 28.26	
Apr.	1 15 6.41			3 6 6.60			18 20 40.50	
	3 16 19.78	9 50.67		5 7 19.12	9 50.50		20 21 52.77	9
	5 17 33.14			7 8 31.62			22 23 5.06	
	7 18 46.50			9 9 44.10			25 0 17.38	
	9 19 59.87			11 10 56.57			27 1 29.73	
	11 21 13.23			13 12 9.02			29 2 42.10	
	....			15 13 21.45	9 50.48		31 3 54.50	
	....			17 14 33.86			33 5 6.93	

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF JUPITER, SYSTEM II.

GREENWICH MEAN TIME.

	Transit of Zero Meridian.	Interval between Successive Transits.		Transit of Zero Meridian.	Interval between Successive Transits.		Transit of Zero Meridian.	Interval between Successive Transits.
	d h m	h m		d h m	h m		d h m	h m
	1 5 4.49	9 55.77	June	5 9 1.44	9 55.81	Sept.	20 22 33.66	9 55.65
	3 6 43.31			7 10 40.50			23 0 11.91	
	5 8 22.15			9 12 19.56			25 1 50.14	
	7 10 1.02			11 13 58.60			27 3 28.36	
	9 11 39.91			13 15 37.63			29 5 6.55	
	11 13 18.82	9 55.79		15 17 16.65	9 55.80	Oct.	1 6 44.73	9 55.63
	13 14 57.75			17 18 55.65			3 8 22.89	
	15 16 36.70			19 20 34.64			5 10 1.04	
	17 18 15.67			21 22 13.62			7 11 39.15	
	19 19 54.66			23 23 52.59			9 13 17.25	
	21 21 33.67	9 55.81		26 1 31.54	9 55.78		11 14 55.34	9 55.61
	23 23 12.69			28 3 10.48			13 16 33.41	
	26 0 51.73			30 4 49.41			15 18 11.47	
	28 2 30.79		July	2 6 28.32			17 19 49.51	
	30 4 9.86			4 8 7.22			19 21 27.54	
	1 5 48.95	9 55.82		6 9 46.10	9 55.77		21 23 5.55	9 55.60
	3 7 28.05			8 11 24.97			24 0 43.55	
	5 9 7.16			10 13 3.82			26 2 21.53	
	7 10 46.29			12 14 42.66			28 3 59.50	
	9 12 25.43			14 16 21.49			30 5 37.46	
	11 14 4.58	9 55.83		16 18 0.31	9 55.76	Nov.	1 7 15.41	9 55.59
	13 15 43.74			18 19 39.10			3 8 53.35	
	15 17 22.91			20 21 17.89			5 10 31.29	
	17 19 2.09			22 22 56.65			7 12 9.21	
	19 20 41.28			25 0 35.41			9 13 47.12	
	21 22 20.48	9 55.84		27 2 14.14	9 55.74		11 15 25.04	9 55.58
	23 23 59.69			29 3 52.86			13 17 2.94	
	26 1 38.90			31 5 31.57			15 18 40.84	
	28 3 18.12		Aug.	2 7 10.26			17 20 18.75	
	2 4 57.34			4 8 48.93			19 21 56.65	
	4 6 36.58	9 55.85		6 10 27.59	9 55.73		21 23 34.55	9 55.58
	6 8 15.81			8 12 6.23			24 1 12.47	
	8 9 55.06			10 13 44.85			26 2 50.38	
	10 11 34.31			12 15 23.46			28 4 28.31	
	12 13 13.56			14 17 2.05			30 6 6.24	
	14 14 52.81	9 55.85		16 18 40.62	9 55.71	Dec.	2 7 44.19	9 55.60
	16 16 32.07			18 20 19.18			4 9 22.15	
	18 18 11.33			20 21 57.72			6 11 0.13	
	20 19 50.59			22 23 36.24			8 12 38.13	
	22 21 29.85			25 1 14.74			10 14 16.15	
	24 23 9.12	9 55.85		27 2 53.23	9 55.69		12 15 54.19	9 55.62
	27 0 48.39			29 4 31.70			14 17 32.26	
	29 2 27.66			31 6 10.15			16 19 10.35	
	31 4 6.93		Sept.	2 7 48.58			18 20 48.47	
	2 5 46.19			4 9 27.00			20 22 26.62	
	4 7 25.46	9 55.85		6 11 5.39	9 55.67		23 0 4.79	9 55.65
	6 9 4.72			8 12 43.77			25 1 42.99	
	8 10 43.98			10 14 22.14			27 3 21.22	
	10 12 23.25			12 16 0.48			29 4 59.48	
	12 14 2.49			14 17 38.80			31 6 37.77	
	. . . .			16 19 17.11	9 55.65		33 8 16.08	9 55.87
	. . . .			18 20 55.40			35 9 54.41	

South



North

APPARENT ORBITS OF THE SATELLITES OF JUPITER AT DATE OF (TION, NOVEMBER 28, 1917, AS SEEN IN AN INVERTING TELESCOP ELONGATED IN THE RATIO OF THREE TO ONE IN THE DIRECTION OI MINOR AXES.

In the above diagram the central ellipse represents the disk of Jupiter, and the inn that of Satellite V.

In the diagrams of the configurations of Jupiter's four brighter satellites, pages Jupiter is represented by a light disk, ○, in the center of the page, and the relative pc the satellites at the Greenwich time stated above the diagrams are indicated by dots. ignation of each satellite is shown by a numeral placed to the right or left of the dot, as the motion of the satellite at the instant in question is toward the east or toward the motion being always toward the numeral. In constructing the diagrams the latitud satellites are always considered zero, except where two or more of them chance to be the same distance from the planet, when they are placed one above the other, accordin apparent latitudes. If, at the epoch of any configuration, one or more satellites are on the disk of the planet, that phenomenon is indicated by a light disk, ○, at the left-l of the page; and if any satellites are invisible on account of being occulted behind th the planet, or eclipsed by its shadow, that circumstance is indicated by a dark disk, (right-hand side of the page. In both cases the annexed numerals serve to point o satellites are thus rendered invisible.

MEAN SYNODIC PERIODS OF THE SATELLITES.

	d	h	m	s		d		d	h	m	s		d
I.	1	18	28	35.946	=	1.769 860 49	V.	0	11	57	27.635	=	0.49
II.	3	13	17	53.736	=	3.554 094 17	VI.					=	266.00
III.	7	3	59	35.856	=	7.166 387 22	VII.					=	276.67
IV.	16	18	5	6.916	=	16.753 552 27							

SATELLITE V.

[GREE]NWICH MEAN TIME OF EVERY TWENTIETH GREATEST ELONGATION.

	d	h			d	h			d	h			d	h	
	1	10.2	E.	Oct.	12	22.7	E.	Jan.	1	16.2	W.	Oct.	13	4.7	W.
	11	9.3	E.		22	21.8	E.		11	15.3	W.		23	3.8	W.
	21	8.5	E.	Nov.	1	20.9	E.		21	14.5	W.	Nov.	2	2.9	W.
	31	7.7	E.		11	20.0	E.		31	13.7	W.		12	2.0	W.
	..	..			21	19.1	E.		..	..			22	1.0	W.
	3	2.3	E.	Dec.	1	18.1	E.	Sept.	3	8.2	W.	Dec.	2	0.1	W.
	13	1.4	E.		11	17.2	E.		13	7.4	W.		11	23.2	W.
	23	0.5	E.		21	16.3	E.		23	6.5	W.		21	22.3	W.
	2	23.6	E.		31	15.4	E.	Oct.	3	5.6	W.		31	21.4	W.

[G]REENWICH MEAN TIME OF SUPERIOR GEOCENTRIC CONJUNCTION.

SATELLITE I.

	d	h	m	s		d	h	m	s		d	h	m	s		d	h	m	s
	1	21	29	47	Mar.	26	2	41	45	July	20	23	58	36	Oct.	12	4	14	48
	3	15	58	14		27	21	12	7		22	18	28	15		13	22	41	38
	5	10	26	39		29	15	42	32		24	12	57	48		15	17	8	31
	7	4	55	13		31	10	12	56		26	7	27	21		17	11	35	15
	8	23	23	48	Apr.	2	4	43	20		28	1	56	49		19	6	1	59
	10	17	52	32		3	23	13	45		29	20	26	19		21	0	28	33
	12	12	21	14		5	17	44	12		31	14	55	42		22	18	55	11
	14	6	50	5		7	12	14	39	Aug.	2	9	25	6		24	13	21	39
	16	1	18	56		9	6	45	5		4	3	54	24		26	7	48	9
	17	19	47	57		11	1	15	31		5	22	23	44		28	2	14	29
	19	14	16	54		12	19	46	0		7	16	52	57		29	20	40	53
	21	8	46	1		14	14	16	28		9	11	22	10		31	15	7	8
	23	3	15	7		16	8	46	55		11	5	51	17	Nov.	2	9	33	26
	24	21	44	22		18	3	17	22		13	0	20	27		4	3	59	34
	26	16	13	34		19	21	47	52		14	18	49	28		5	22	25	46
	28	10	42	54		21	16	18	21		16	13	18	30		7	16	51	50
	30	5	12	14		..	..	..	..		18	7	47	25		9	11	17	58
	31	23	41	43		..	..	..	..		20	2	16	22		11	5	43	56
	2	18	11	8		..	..	..	..		21	20	45	12		13	0	10	0
	4	12	40	40	June	1	9	58	2		23	15	14	1		14	18	35	57
	6	7	10	13		3	4	28	23		25	9	42	42		16	13	1	57
	8	1	39	52		4	22	58	39		27	4	11	27		18	7	27	50
	9	20	9	29		6	17	28	56		28	22	40	3		20	1	53	49
	11	14	39	12		8	11	59	11		30	17	8	39		21	20	19	41
	13	9	8	55		10	6	29	29	Sept.	1	11	37	6		23	14	45	39
	15	3	38	45		12	0	59	39		3	6	5	37		25	9	11	29
	16	22	8	32		13	19	29	51		5	0	33	58		27	3	37	27
	18	16	38	25		15	14	0	2		6	19	2	20		28	22	3	19
	20	11	8	17		17	8	30	14		8	13	30	33		30	16	29	17
	22	5	38	17		19	3	0	21		10	7	58	49	Dec.	2	10	55	9
	24	0	8	13		20	21	30	29		12	2	26	55		4	5	21	10
	25	18	38	14		22	16	0	35		13	20	55	1		5	23	47	5
	27	13	8	15		24	10	30	41		15	15	22	58		7	18	13	9
	1	7	38	21		26	5	0	43		17	9	50	58		9	12	39	6
	3	2	8	25		27	23	30	45		19	4	18	48		11	7	5	13
	4	20	38	33		29	18	0	45		20	22	46	38		13	1	31	17
	6	15	8	41	July	1	12	30	45		22	17	14	18		14	19	57	29
	8	9	38	54		3	7	0	41		24	11	42	2		16	14	23	36
	10	4	9	4		5	1	30	37		26	6	9	35		18	8	49	54
	11	22	39	17		6	20	0	30		28	0	37	9		20	3	16	8
	13	17	9	31		8	14	30	25		29	19	4	32		21	21	42	32
	15	11	39	49		10	9	0	14	Oct.	1	13	31	59		23	16	8	51
	17	6	10	4		12	3	30	3		3	7	59	15		25	10	35	22
	19	0	40	23		13	21	59	49		5	2	26	32		27	5	1	51
	20	19	10	41		15	16	29	36		6	20	53	38		28	23	28	30
	[illegible]	13	41	3		17	10	59	17		8	15	20	49		30	17	55	[illegible]
	[illegible]	8	11	23		19	5	28	59		10	9	47	48		32	12	21	[illegible]

GREENWICH MEAN TIME OF GEOCENTRIC CONJUNCTI[ON]

II.

SATELLITE III.

	d	h	m	s		d	h	m	s		d	h	m	s		d
Jan.	5	12	3	55	Apr.	1	15	14	21	July	18	10	20	8	Oct.	12
	12	16	0	55		8	19	43	22		25	14	38	49		19
	19	20	3	2		16	0	13	17	Aug.	1	18	55	9		26
	27	0	9	0		. .	. .	. .	. .		8	23	9	21	Nov.	2
Feb.	[illegible]	4	19	11		. .	. .	. .	. .		16	3	19	48		9
	10	8	32	7		. .	. .	. .	. .		23	7	26	51		17
	17	12	48	7	June	5	7	48	13		[illegible]	11	29	36		24
	24	17	7	0		12	12	17	1	Sept.	6	15	28	20	Dec.	1
Mar.	3	21	28	35		19	16	45	24		13	19	23	11		8
	11	1	52	55		26	21	11	52		20	23	13	38		15
	18	6	18	39	July	4	1	36	53		28	3	0	1		22
	25	10	46	13		11	5	59	32	Oct.	5	6	40	55		29

SATELLITE IV.

	d	h	m	s		d	h	m	s		d	h	m	s		d
Jan.	6	7	33	33	Apr.	17	6	9	23	June	23	17	50	16	Oct.	2
	23	1	41	8		. .	. .	. .	. .	July	10	14	16	8		[illegible]
Feb.	8	20	41	26		. .	. .	. .	. .		27	10	16	35	Nov.	4
	25	16	24	24		. .	. .	. .	. .	Aug.	13	5	42	52		21
Mar.	14	12	38	46		. .	. .	. .	. .		30	0	26	38	Dec.	7
	31	9	16	28	June	6	21	6	15	Sept.	15	18	18	54		[illegible]

DIFFERENTIAL COORDINATES OF SATELLITE VI.

FOR GREENWICH MEAN NOON.

Date.	$\alpha_{VI}-\alpha_{Jup.}$	$\delta_{VI}-\delta_{Jup.}$	Date.	$\alpha_{VI}-\alpha_{Jup.}$	$\delta_{VI}-\delta_{Jup.}$	Date.	$\alpha_{VI}-\alpha_{Jup.}$	$\delta_{VI}-\delta_{Jup.}$
	m s	′		m s	′		m s	′
0	+4 21	− 5.0	June 18	−2 16	−15.3	Sept. 26	+3 39	−13.2
4	4 20	3.5	22	2 7	16.8	30	3 53	11.1
8	4 18	2.0	26	1 58	18.1	Oct. 4	4 5	8.9
12	4 14	− 0.5	30	1 48	19.4	8	4 16	6.5
16	4 9	+ 0.9	July 4	1 37	20.6	12	4 26	3.9
20	+4 3	+ 2.3	8	−1 26	−21.6	16	+4 33	− 1.3
24	3 55	3.7	12	1 14	22.5	20	4 38	+ 1.4
28	3 46	5.0	16	1 1	23.4	24	4 41	4.2
1	3 36	6.3	20	0 47	24.1	28	4 40	7.0
5	3 25	7.5	24	0 33	24.7	Nov. 1	4 37	9.8
9	+3 13	+ 8.7	28	−0 19	−25.1	5	+4 30	+12.6
13	3 0	9.8	Aug. 1	−0 4	25.4	9	4 20	15.3
17	2 46	10.8	5	+0 11	25.6	13	4 6	17.8
21	2 32	11.8	9	0 27	25.6	17	3 49	20.2
25	2 17	12.7	13	0 43	25.5	21	3 28	22.3
1	+2 1	+13.5	17	+0 59	−25.2	25	+3 3	+24.0
5	1 44	14.2	21	1 15	24.7	29	2 36	25.4
9	1 27	14.8	25	1 32	24.1	Dec. 3	2 5	26.3
13	1 9	15.2	29	1 48	23.3	7	1 33	26.7
17	0 51	15.6	Sept. 2	2 5	22.4	11	0 59	26.6
21	+0 32	+15.7	6	+2 21	−21.3	15	+0 25	+26.0
25	+0 14	15.7	10	2 38	20.0	19	−0 10	24.9
29	−0 5	15.5	14	2 54	18.6	23	0 43	23.3
2	−0 23	+15.1	18	3 10	17.0	27	1 15	21.3
	. . .	. . .	22	+3 25	−15.2	31	−1 44	+19.0

DIFFERENTIAL COORDINATES OF SATELLITE VII.

Date.	$\alpha_{VII}-\alpha_{Jup.}$	$\delta_{VII}-\delta_{Jup.}$	Date.	$\alpha_{VII}-\alpha_{Jup.}$	$\delta_{VII}-\delta_{Jup.}$	Date.	$\alpha_{VII}-\alpha_{Jup.}$	$\delta_{VII}-\delta_{Jup.}$
	m s	′		m s	′		m s	′
0	−4 39	+ 7.8	June 18	+1 46	− 2.9	Sept. 26	−4 28	+24.2
4	4 32	8.4	22	1 34	1.7	30	4 39	24.0
8	4 23	8.9	26	1 22	− 0.5	Oct. 4	4 48	23.8
12	4 14	9.3	30	1 8	+ 0.8	8	4 56	23.3
16	4 3	9.6	July 4	0 54	2.2	12	5 3	22.7
20	−3 52	+ 9.8	8	+0 40	+ 3.6	16	−5 7	+21.9
24	3 40	10.0	12	0 25	5.1	20	5 9	20.9
28	3 28	10.1	16	+0 10	6.6	24	5 10	19.8
1	3 15	10.0	20	−0 6	8.0	28	5 8	18.5
5	3 1	10.0	24	0 22	9.5	Nov. 1	5 3	17.1
9	−2 47	+ 9.8	28	−0 38	+10.9	5	−4 56	+15.6
13	2 33	9.5	Aug. 1	0 54	12.3	9	4 47	14.0
17	2 19.	9.2	5	1 11	13.7	13	4 34	12.2
21	2 4	8.7	9	1 27	15.1	17	4 19	10.4
25	1 49	8.3	13	1 44	16.4	21	4 2	8.5
1	−1 34	+ 7.7	17	−2 0	+17.6	25	−3 41	+ 6.5
5	1 20	7.1	21	2 17	18.7	29	3 19	4.6
9	1 4	6.4	25	2 33	19.8	Dec. 3	2 54	2.6
13	0 49	5.7	29	2 49	20.8	7	2 28	+ 0.7
17	0 34	4.9	Sept. 2	3 5	21.7	11	2 0	− 1.1
21	−0 19	+ 4.1	6	−3 20	+22.4	15	−1 31	− 2.9
25	−0 4	3.2	10	3 35	23.1	19	1 1	4.6
29	+0 11	2.3	14	3 50	23.6	23	0 31	6.2
2	+0 26	+ 1.3	18	4 4	23.9	27	−0 1	7.7
	. . .	. . .	22	−4 16	+24.1	31	+0 28	− 9.0

G MEAN TIME.

JANUARY.

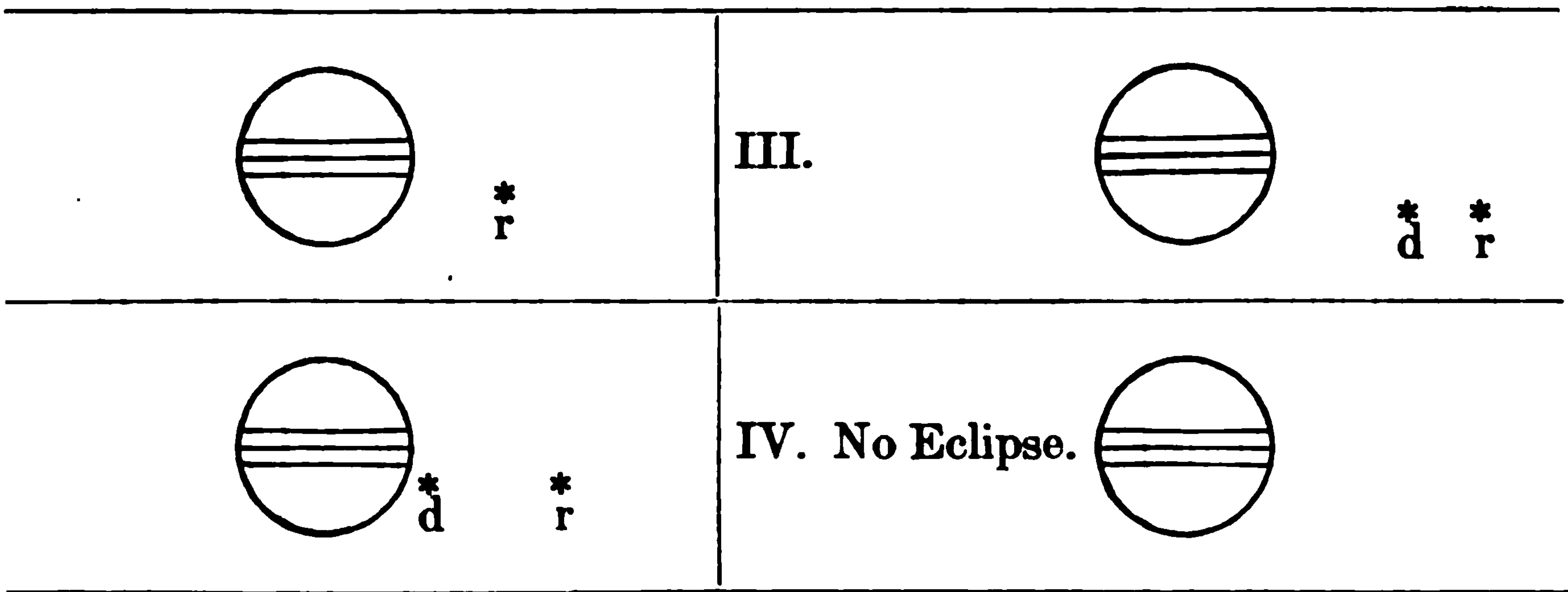
d	h m s	Phenomenon
1	0 22 40	I. Sh. I
	1 15 1	I. Tr. E.
	2 31 14	I. Sh. E.
	5 56 51	II. Oc. D.
	8 32 41	II. Oc. R.
	8 33 57	II. Ec D.
	11 6 46	II.*Ec. R.
	20 24 11	I. Oc. D.
	21 10 56	III. Tr. I.
	23 6 33	III. Tr. E.
	23 53 27	I. Ec. R.
2	2 35 59	III. Sh. I.
	4 15 50	III. Sh. E.
	17 34 3	I.*Tr. I.
	18 51 35	I. Sh. I.
	19 43 20	I. Tr. E.
	21 0 8	I. Sh. E.
3	1 2 53	II. Tr. I.
	3 38 5	II. Tr. E.
	3 42 24	II. Sh. I.
	6 14 3	II. Sh. E.
	14 52 37	I.*Oc. D.
	18 22 27	I Ec. R.
4	12 2 23	I.*Tr. I.
	13 20 27	I.*Sh. I.
	14 11 42	I.*Tr E.
	15 28 59	I *Sh. E.
	19 12 58	II. Oc. D.
	21 49 3	II. Oc R.
	21 52 35	II. Ec. D.
5	0 25 23	II. Ec R.
	9 21 2	I. Oc D.
	11 3 59	III.*Oc D.
	12 51 20	I *Ec R.
	13 3 51	III.*Oc R
	16 33 24	III.*Ec. D.
	18 15 56	III. Ec R
6	6 30 51	I. Tr. I.
	7 49 24	I. Sh. I
	8 40 12	I. Tr. E.
	9 57 56	I. Sh. E.
	14 20 22	II.*Tr. I.
	16 55 38	II.*Tr. E.
	17 1 42	II.*Sh. I.
	19 33 10	II. Sh. E.
7	3 49 35	I. Oc. D.
	7 20 18	I. Ec. R.
8	0 59 10	I. Tr. I.
	2 18 16	I. Sh. I.
	3 8 43	I. Tr. E.
	4 26 48	I. Sh. E
	8 29 41	II. Oc. D.
	11 5 58	II.*Oc. R.
	11 11 9	II.*Ec. D.
8	13 43 53	II.*Ec. R.
	22 18 9	I. Oc. D.
9	1 4 58	III. Tr. I.
	1 49 13	I. Ec. R.
	3 3 13	III. Tr. E.
	6 38 58	III. Sh. I.
	8 18 15	III. Sh. E.
	19 27 55	I. Tr. I.
	20 47 13	I. Sh. I.
	21 37 20	I. Tr. E.
	[illegible]	I. Sh. E.
10	3 37 47	II. Tr. I.
	6 13 10	II. Tr. E.
	[illegible]	II. Sh. I.
	8 51 50	II. Sh. E.
	16 46 53	I.*Oc. D.
	20 18 12	I. Ec. R.
11	13 56 32	I.*Tr. I.
	15 16 5	I.*Sh. I.
	16 5 59	I.*Tr. E.
	17 24 36	I. Sh. E.
	21 47 3	II. Oc. D.
12	0 23 33	II. Oc. R.
	0 29 53	II. Ec. D.
	3 2 37	II. Ec R.
	11 15 35	I.*Oc. D.
	14 47 5	I.*Ec. R.
	14 59 49	III.*Oc. D
	17 2 1	III.*Oc. R.
	20 35 44	III. Ec. D.
	22 17 46	III. Ec. R.
13	8 25 17	I. Tr. I.
	9 45 3	I. Sh. I.
	10 34 47	I. Tr. E
	11 53 34	I.*Sh. E.
	16 56 18	II.*Tr. I.
	19 31 44	II. Tr. E.
	19 39 40	II. Sh. I.
	22 10 50	II. Sh. E.
14	5 44 25	I. Oc. D.
	9 16 3	I. Ec. R.
15	2 54 3	I. Tr. I.
	4 13 56	I. Sh. I.
	5 3 35	I. Tr. E.
	6 22 28	I. Sh. E.
	11 4 59	II.*Oc. D.
	13 41 30	II.*Oc. R.
	13 48 31	II.*Ec. D.
	16 21 12	II.*Ec. R.
16	0 13 15	I. Oc. D.
	3 44 57	I. Ec. R.
	5 3 20	III. Tr I.
	7 3 42	III. Tr. E.
16	10 41 21	III.*Sh. I.
	12 20 7	III.*Sh. E.
	21 22 55	I. Tr. I.
	[illegible]	I. Sh. I.
	23 32 29	I. Tr. E.
17	0 51 25	I. Sh. E.
	6 14 48	II. Tr. I.
	8 50 19	II. Tr. E.
	[illegible]	II. Sh. I.
	11 29 28	II.*Sh. E.
	18 42 16	I. Oc. D.
	22 13 56	I. Ec. R.
18	15 51 48	I.*Tr. I.
	17 11 46	I. Sh. I.
	18 1 24	I. Tr. E.
	19 20 18	I. Sh. E.
19	0 23 34	II. Oc. D.
	3 0 26	II. Oc. R.
	3 7 23	II. Ec. D.
	5 40 3	II. Ec. R.
	13 11 13	I.*Oc. D.
	16 42 49	I.*Ec. R.
	19 1 2	III. Oc. D.
	21 5 3	III. Oc. R.
20	0 38 40	III. Ec. D.
	2 20 13	III. Ec. R.
	10 20 49	I. Tr. I.
	11 40 45	I.*Sh. I
	12 30 29	I.*Tr. E.
	13 49 17	I *Sh E.
	19 34 17	II. Tr. I.
	22 9 51	II. Tr. E.
	22 17 29	II. Sh. I.
21	0 48 23	II Sh. E.
	7 40 19	I. Oc. D.
	11 11 46	I.*Ec. R.
22	4 49 51	I. Tr. I.
	6 9 38	I. Sh. I.
	6 59 32	I. Tr. E
	8 18 12	I. Sh. E
	13 42 35	II.*Oc. D.
	16 19 35	II.*Oc. R.
	16 26 2	II.*Ec. D.
	18 58 39	II. Ec. R.
23	2 9 25	I. Oc. D
	5 40 39	I. Ec. R.
	9 6 10	III. Tr. I.
	11 8 13	III *Tr. E.
	14 43 32	III *Sh. I.
	16 21 53	III.*Sh. E.
	23 18 59	I. Tr. I.
24	0 38 36	I. Sh. I.
	1 28 42	I. Tr. E.
24	2 47 9	
	8 53 48	
	11 29 28	
	11 36 11	
	14 6 59	
	20 38 40	
25	0 9 37	
	17 48 7	
	19 7 29	
	[illegible]	
	21 16 3	
26	3 2 19	
	5 39 28	
	5 45 0	
	8 17 37	
	15 7 52	
	[illegible]	
	23 6 18	
27	1 11 43	
	4 41 3	
	6 22 12	
	12 17 23	
	13 36 28	
	14 27 12	
	15 45 3	
	22 14 10	
28	0 49 49	
	0 55 7	
	3 25 48	
	9 37 12	
	13 7 26	
29	6 46 39	
	8 5 21	
	8 56 30	
	10 13 59	
	16 22 23	
	18 59 38	
	19 3 41	
	21 36 16	
30	4 6 32	
	7 36 19	
	13 13 6	
	15 16 22	
	18 45 35	
	20 23 32	
31	1 16 2	
	2 34 20	
	3 25 55	
	4 42 57	
	11 34 35	
	14 10 16	
	14 13 44	
	16 44 21	
	22 36 0	

NOTE.—I, denotes ingress; E., egress; D., disappearance; R., reappearance; Ec., eclipse; Oc., occultation; Tr., *transit of the satellite*; Sh., transit of the shadow. *Visible at Washington.

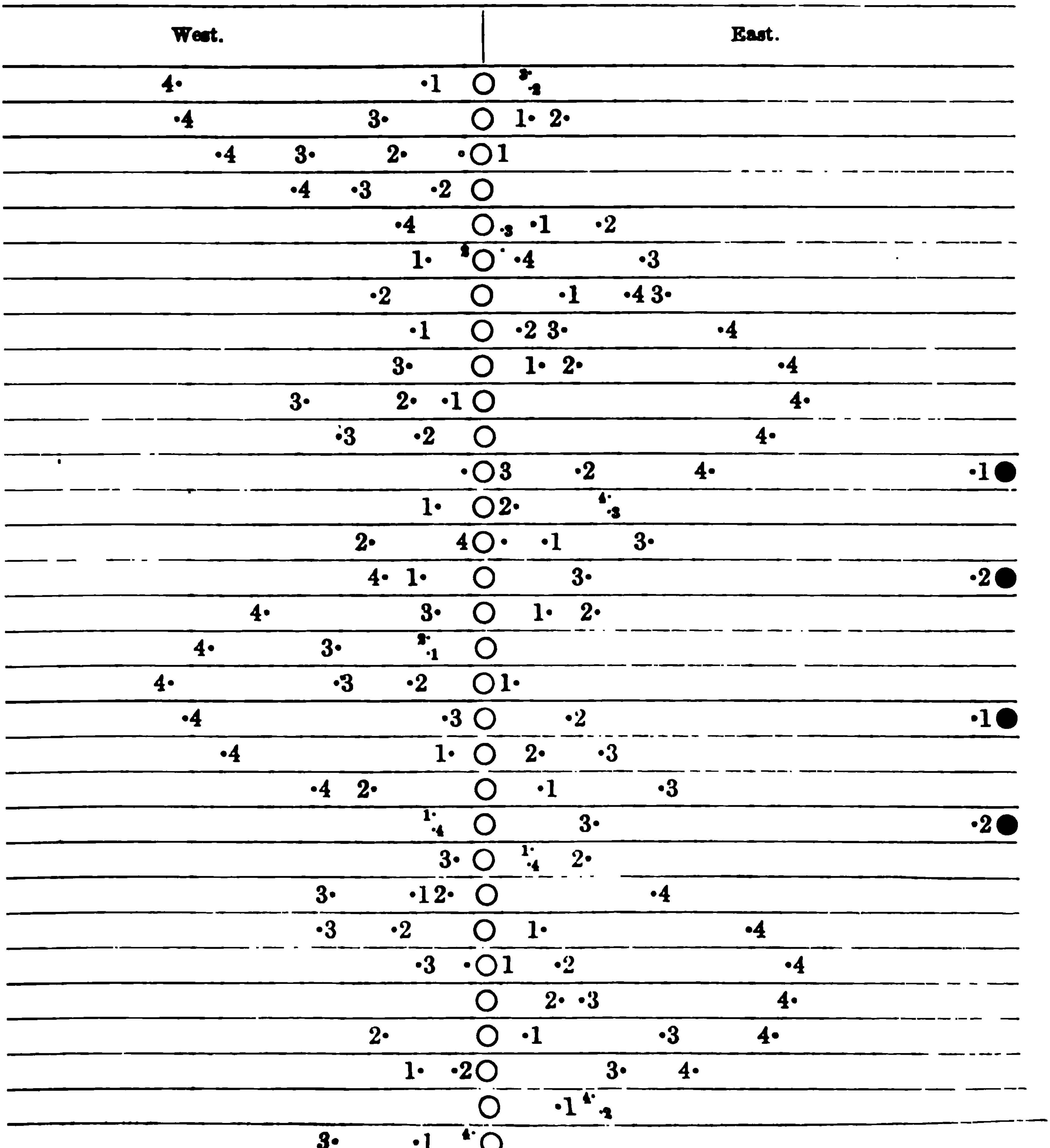
GREENWICH MEAN TIME.

JANUARY.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



Configurations at 14ʰ 0ᵐ for an Inverting Telescope.



GREENWICH MEAN TIME.

FEBRUARY.

d	h	m	s	
1	2	5	16	I. Ec. R.
	19	45	24	I. Tr. I.
	21	3	13	I. Sh. I.
	21	55	20	I. Tr. E.
	23	11	52	I. Sh. E.
2	5	43	12	II. Oc. D.
	8	20	35	II. Oc. R.
	8	22	46	II. Ec. D.
	10	55	20	II. Ec. R.
	17	5	25	I. Oc. D.
	20	34	8	I. Ec. R.
3	3	15	59	III. Oc. D.
	5	22	23	III. Oc. R.
	8	43	36	III. Ec. D.
	10	24	27	III. Ec. R.
	14	14	54	I.*Tr. I.
	15	32	12	I.*Sh. I.
	16	24	52	I. Tr. E.
	17	40	52	I. Sh. E.
4	0	55	45	II. Tr. I.
	3	31	26	II. Tr. E.
	3	32	33	II. Sh. I.
	6	3	3	II. Sh. E.
	11	34	58	I.*Oc. D.
	15	3	3	I.*Ec. R.
5	8	44	22	I. Tr. I.
	10	1	5	I. Sh. I.
	10	54	24	I. Tr. E.
	12	9	48	I.*Sh. E.
	19	4	13	II. Oc. D.
6	0	14	1	II. Ec. R.
	6	4	30	I. Oc. D.
	9	31	55	I. Ec. R.
	17	23	57	III. Tr. I.
	19	28	5	III. Tr. E.
	22	47	38	III. Sh. I.
7	0	25	14	III. Sh. E.
	3	13	59	I. Tr. I.
	4	30	4	I. Sh. I.
	5	24	2	I. Tr. E.
	6	38	47	I. Sh. E.
	14	16	58	II.*Tr. I.
	16	51	5	II. Sh. I.
	16	52	39	II. Tr. E.
	19	21	32	II. Sh. E.
8	0	34	10	I. Oc. D.
	4	0	51	I. Ec. R.
	21	43	32	I. Tr. I.
	22	58	57	I. Sh. I.
	23	53	38	I. Tr. E.
9	1	7	42	I. Sh. E.
	8	25	59	II. Oc. D.
	13	33	9	II.*Ec. R.

d	h	m	s	
9	19	3	47	I. Oc. D.
	22	29	43	I. Ec. R.
10	7	28	37	III. Oc. D.
	9	35	38	III. Oc. R.
	12	45	24	III.*Ec. D.
	14	25	58	III.*Ec. R.
	16	13	15	I. Tr. I.
	17	27	56	I. Sh. I.
	18	23	24	I. Tr. E.
	19	36	43	I. Sh. E.
11	3	38	51	II. Tr. I.
	6	9	48	II. Sh. I.
	6	14	31	II. Tr. E.
	8	40	10	II. Sh. E.
	13	33	31	I.*Oc. D.
	16	58	36	I. Ec. R.
12	10	42	55	I. Tr. I.
	11	56	50	I.*Sh. I.
	12	53	7	I.*Tr. E.
	14	5	39	I.*Sh. E.
	21	47	53	II. Oc. D.
13	2	51	51	II. Ec. R.
	8	3	14	I. Oc. D.
	11	27	27	I.*Ec. R.
	21	38	57	III. Tr. I.
	23	43	36	III. Tr. E.
14	2	50	18	III. Sh. I.
	4	27	36	III. Sh. E.
	5	12	43	I. Tr. I.
	6	25	48	I. Sh. I.
	7	22	57	I. Tr. E.
	8	34	39	I. Sh. E.
	17	0	45	II. Tr. I.
	19	28	16	II. Sh. I.
	19	36	26	II. Tr. E.
	21	58	35	II. Sh. E.
15	2	33	4	I. Oc. D.
	5	56	22	I. Ec. R.
	23	42	27	I. Tr. I.
16	0	54	41	I. Sh. I.
	1	52	44	I. Tr. E.
	3	3	33	I. Sh. E.
	11	10	32	II. Oc. D.
	16	11	5	II. Ec. R.
	21	2	52	I. Oc. D.
17	0	25	13	I. Ec. R.
	11	44	29	III.*Oc. D.
	13	51	46	III.*Oc. R.
	16	47	1	III. Ec. D.
	18	12	21	I. Tr. I.
	18	27	21	III. Ec. R.
	19	23	40	I. Sh. I.
	20	22	41	I. Tr. E.

d	h	m	s	
17	21	32	35	I. Sh. E.
18	6	23	14	II. Tr. I.
	8	46	50	II. Sh. I.
	8	58	51	II. Tr. E.
	11	17	5	II. Sh. E.
	15	32	45	I. Oc. D.
	18	54	5	I. Ec. R.
19	12	42	12	I.*Tr. I.
	13	52	34	I.*Sh. I.
	14	52	35	I.*Tr. E.
	16	1	31	I. Sh. E.
20	0	33	15	II. Oc. D.
	5	29	50	II. Ec. R.
	10	2	38	I. Oc. D.
	13	22	55	I.*Ec. R.
21	1	56	54	III. Tr. I.
	4	1	48	III. Tr. E.
	6	52	35	III. Sh. I.
	7	12	11	I. Tr. I.
	8	21	32	I. Sh. I.
	8	29	43	III. Sh. E.
	9	22	35	I. Tr. E.
	10	30	31	I. Sh. E.
	19	45	46	II. Tr. I.
	22	5	13	II. Sh. I.
	22	21	22	II. Tr. E.
22	0	35	25	II. Sh. E.
	4	32	37	I. Oc. D.
	7	51	49	I. Ec. R.
23	1	42	5	I. Tr. I.
	2	50	24	I. Sh. I.
	3	52	32	I. Tr. E.
	4	59	25	I. Sh. E.
	13	56	42	II.*Oc. D.
	18	49	7	II. Ec. R.
	23	2	34	I. Oc. D.
24	2	20	38	I. Ec. R.
	16	3	21	III. Oc. D.
	18	10	38	III. Oc. R.
	20	12	9	I. Tr. I.
	20	48	43	III. Ec. D.
	21	19	23	I. Sh. I.
	22	22	39	I. Tr. E.
	22	28	49	III. Ec. R.
	23	28	27	I. Sh. E.
25	9	8	47	II. Tr. I.
	11	23	40	II. Sh. I.
	11	44	19	II.*Tr. E.
	13	53	49	II.*Sh. E.
	17	32	36	I. Oc. D.
	20	49	30	I. Ec. R.
26	14	42	10	I.*Tr. I.

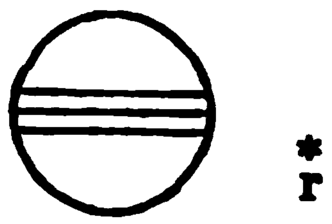
d	h	m	s	
26	15	48	17	I.
	16	52	42	I.
	17	57	23	I.
27	3	20	6	II.
	8	7	52	II.
	12	2	37	I.*
	15	18	19	I.
28	6	18	15	III.
	8	23	9	III.
	9	12	17	I.
	10	17	14	I.
	10	55	18	III.
	11	22	51	I.
	12	26	23	I.*
	12	32	20	III.*
	22	31	53	II.

Note.—I. denotes ingress; E., egress; D., disappearance; R., reappearance; Ec., eclipse; Oc., oc
Tr., transit of the satellite; Sh., transit of the shadow. *Visible at Washington.

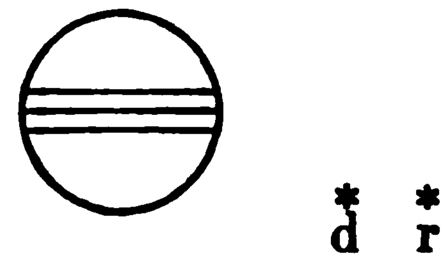
GREENWICH MEAN TIME.

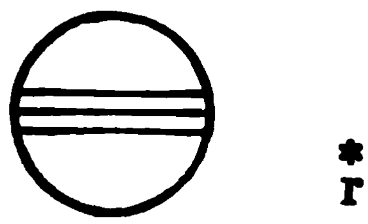
FEBRUARY.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

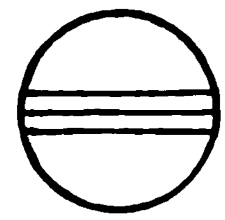


III.





IV. No Eclipse.



Configurations at 13h 30m for an Inverting Telescope.

West.		East.
•3 4••2	O	1•
4• •3 •1	O	•2
4• 1	O•	2• •3
4• 2•	O	•3 •1●
•4 1• •2	O	3•
•4	O	3• •1 •2
•4 3• 1• 2	O•	
•3 •2 •4	O	1•
•3 •1	O	•4 •2●
	O	1• 2• •4 •3●
2• .	O1	•3 •4
•2 1•	O	3• •4
	O	3• •1 •2 4•
3• 1•	O	2• 4•
3• 2•	O	•1 4•
•3 •1	O	4• •2●
4•	O	1• 2• •3●
4• 2• •1	O	•3
4• •2	O	3•
4•	O	•1 3• •2
•4 3• 1•	O	2•
•4 3• 2•	O	•1
•4 •3 •1 •	O	2
•4 •	O	3 1• 2•
2• •1 •	O4	•3
•2 1	O•	•4 3•
	O	•2 3• •4 •1●
3• 1•	O	2• •4

GREENWICH MEAN TIME.

MARCH.

d	h m s	
1	0 41 59	II. Sh. I.
	1 7 23	II. Tr. E.
	3 12 7	II. Sh. E.
	6 32 44	I. Oc. D.
	9 47 11	I. Ec. R.
2	3 42 20	I. Tr. I.
	4 46 6	I. Sh. I.
	5 52 57	I. Tr. E.
	6 55 16	I. Sh. E.
	16 44 16	II. Oc. D.
	21 27 14	II. Ec. R.
3	1 2 48	I. Oc. D.
	4 15 59	I. Ec. R.
	20 25 5	III. Oc. D.
	22 12 33	I. Tr. I.
	22 32 5	III. Oc. R.
	23 15 5	I. Sh. I.
4	0 23 12	I. Tr. E.
	0 50 33	III. Ec. D.
	1 24 18	I. Sh. E.
	2 30 28	III. Ec. R.
	11 55 19	II.*Tr. I.
	14 0 17	II.*Sh. I.
	14 30 44	II.*Tr. E.
	16 30 22	II. Sh. E.
	19 32 57	I. Oc. D.
	22 44 49	I. Ec. R.
5	16 42 42	I. Tr. I.
	17 43 58	I. Sh. I.
	18 53 24	I. Tr. E.
	19 53 13	I. Sh. E.
6	6 8 18	II. Oc. D.
	10 46 0	II. Ec. R.
	14 3 5	I.*Oc. D.
	17 13 37	I. Ec. R.
7	10 41 27	III. Tr. I.
	11 12 57	I. Tr. I.
	12 12 55	I.*Sh. I.
	12 46 7	III.*Tr. E.
	13 23 40	I.*Tr. E.
	14 22 13	I.*Sh. E.
	14 57 21	III. Sh. I.
	16 34 21	III. Sh. E.
8	1 18 53	II. Tr. I.
	3 18 29	II. Sh. I.
	3 54 13	II. Tr. E.
	5 48 34	II. Sh. E.
	8 33 19	I. Oc. D.
	11 42 28	I.*Ec. R.
9	5 43 7	I. Tr. I.
	6 41 46	I. Sh. I.
	7 53 54	I. Tr. E.
	8 51 6	I. Sh. E.

d	h m s	
9	19 33 8	II. Oc. D.
10	0 5 26	II. Ec. R.
	3 3 30	I. Oc. D.
	6 11 15	I. Ec. R.
11	0 13 28	I. Tr. I.
	0 49 39	III. Oc. D.
	1 10 45	I. Sh. I.
	2 24 16	I. Tr. E.
	2 56 11	III. Oc. R.
	3 20 7	I. Sh. E.
	4 52 56	III. Ec. D.
	6 32 42	III. Ec. R.
	14 42 41	II. Tr. I.
	16 36 40	II. Sh. I.
	17 17 55	II. Tr. E.
	19 6 42	II. Sh. E.
	21 33 44	I. Oc. D.
12	0 40 3	I. Ec. R.
	18 43 44	I. Tr. I.
	19 39 37	I. Sh. I.
	20 54 34	I. Tr. E.
	21 49 2	I. Sh. E.
13	8 57 40	II. Oc. D.
	13 24 10	II.*Ec. R.
	16 3 58	I. Oc. D.
	19 8 50	I. Ec. R.
14	13 14 6	I.*Tr. I.
	14 8 34	I. Sh. I.
	15 6 34	III. Tr. I.
	15 24 58	I. Tr. E.
	16 18 1	I. Sh. E.
	17 10 50	III. Tr. E.
	18 59 9	III. Sh. I.
	20 36 9	III. Sh. E.
15	4 6 38	II. Tr. I.
	5 54 49	II. Sh. I.
	6 41 47	II. Tr. E.
	8 24 51	II. Sh. E.
	10 34 17	I. Oc. D.
	13 37 39	I.*Ec. R.
16	7 44 23	I. Tr. I.
	8 37 24	I. Sh. I.
	9 55 18	I. Tr. E.
	10 46 54	I. Sh. E.
	22 23 4	II. Oc. D.
17	2 43 38	II. Ec. R.
	5 4 33	I. Oc. D.
	8 6 26	I. Ec. R.
18	2 14 50	I. Tr. I.
	3 6 23	I. Sh. I.
	4 25 46	I. Tr. E.
	5 15 42	III. Oc. D.

d	h m s	
18	5 15 54	I. Sh. E.
	7 21 36	III. Oc. R.
	8 54 40	III. Ec. D.
	10 34 23	III. Ec. R.
	17 30 46	II. Tr. I.
	19 12 54	II. Sh. I.
	20 5 48	II. Tr. E.
	21 42 54	II. Sh. E.
	23 34 52	I. Oc. D.
19	2 35 12	I. Ec. R.
	20 45 11	I. Tr. I.
	21 35 14	I. Sh. I.
	22 56 9	I. Tr. E.
	23 44 48	I. Sh. E.
20	11 48 4	II. Oc. D.
	16 2 23	II. Ec. R.
	18 5 11	I. Oc. D.
	21 3 58	I. Ec. R.
21	15 15 40	I. Tr. I.
	16 4 10	I. Sh. I.
	17 26 39	I. Tr. E.
	18 13 46	I. Sh. E.
	19 33 24	III. Tr. I.
	21 37 3	III. Tr. E.
	23 0 47	III. Sh. I.
22	0 37 48	III. Sh. E.
	6 55 0	II. Tr. I.
	8 30 56	II. Sh. I.
	9 29 56	II. Tr. E.
	11 0 55	II. Sh. E.
	12 35 34	I.*Oc. D.
	15 32 45	I. Ec. R.
23	9 46 2	I. Tr. I.
	10 33 0	I. Sh. I.
	11 57 4	I.*Tr. E.
	12 42 38	I.*Sh. E.
24	1 13 58	II. Oc. D.
	5 21 54	II. Ec. R.
	7 5 54	I. Oc. D.
	10 1 31	I. Ec. R.
25	4 16 34	I. Tr. I.
	5 1 57	I. Sh. I.
	6 27 37	I. Tr. E.
	7 11 37	I. Sh. E.
	9 43 39	III. Oc. D.
	11 48 48	III. Oc. R.
	12 56 30	III.*Ec. D.
	14 36 14	III. Ec. R.
	20 19 23	II. Tr. I.
	21 48 54	II. Sh. I.
	22 54 11	II. Tr. E.
26	0 18 52	II. Sh. E.
	1 36 17	I. Oc. D.

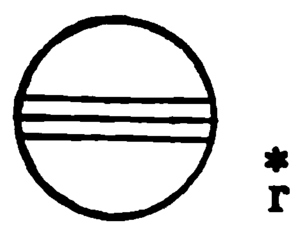
d	h m s	
26	4 30 16	I.
	22 47 0	I.
	23 30 48	I.
27	0 58 5	I.
	1 40 30	I.
	14 39 22	II.
	18 40 39	II.
	20 6 39	I.
	22 59 0	I.
28	17 17 34	I.
	17 59 44	I.
	19 28 39	I.
	20 9 28	I.
29	0 1 47	III.
	2 4 42	III.
	3 2 22	III.
	4 39 26	III.
	9 43 53	II.
	11 6 51	II.
	12 18 33	II.*
	13 36 48	II.
	14 37 6	I.
	17 27 46	I.
30	11 48 0	I.
	12 28 33	I.*
	13 59 8	I.
	14 38 19	I.
31	4 5 38	II.
	8 0 10	II.
	9 7 30	I.
	11 56 30	I.

NOTE.—*I.* denotes ingress; E., egress; D., disappearance; R., reappearance; Ec., eclipse; Oc., occ
Tr., *transit of the satellite;* Sh., transit of the shadow. *Visible at Washington.

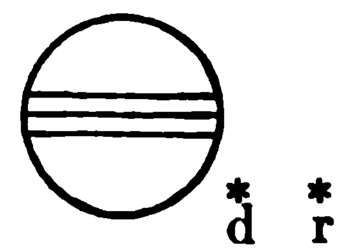
GREENWICH MEAN TIME.

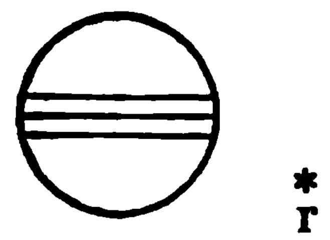
MARCH.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

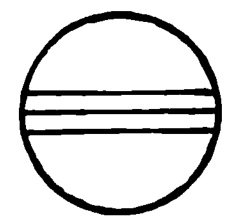


III.

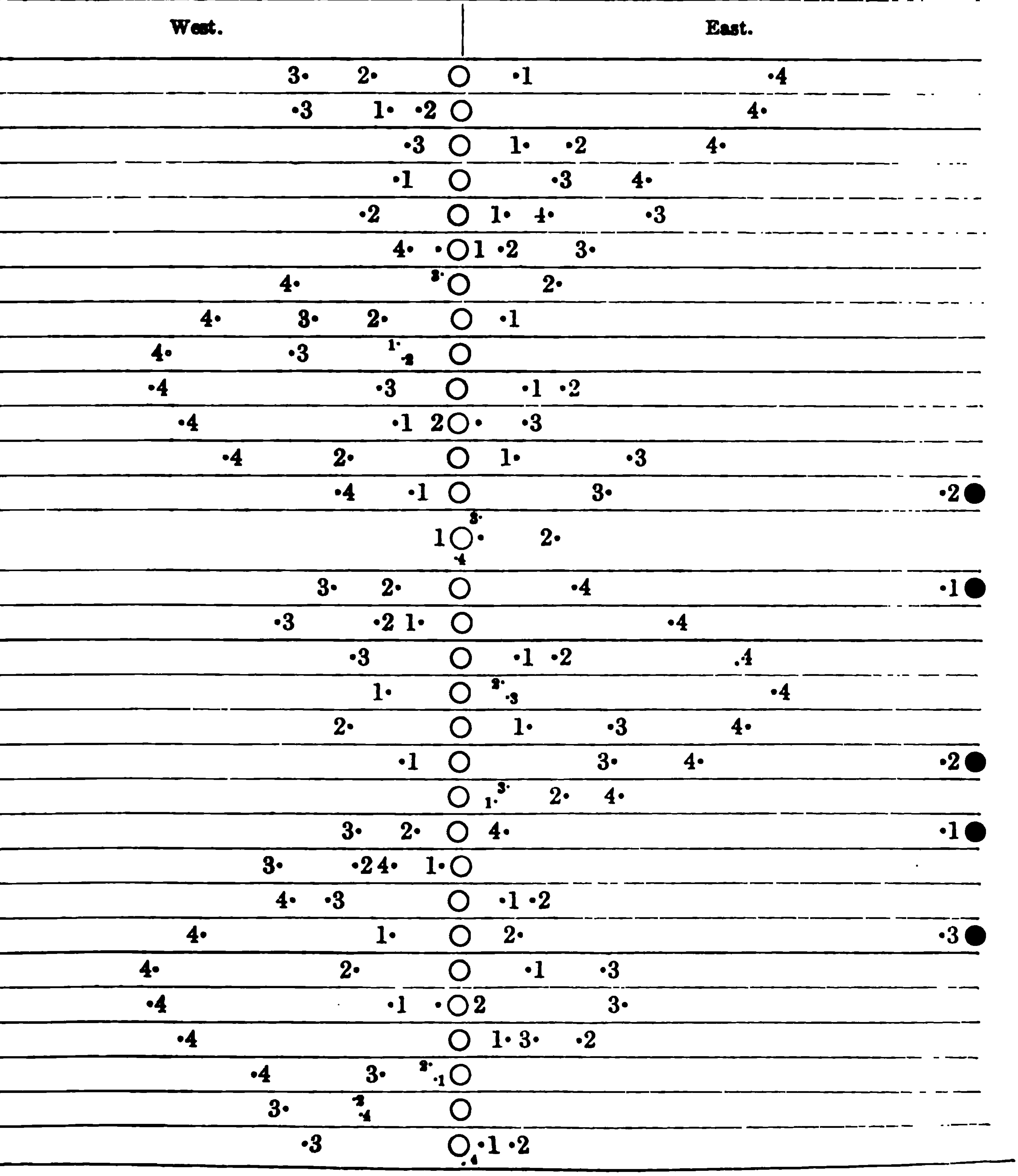




IV. No Eclipse.



Configurations at 13h 0m for an Inverting Telescope.



GREENWICH MEAN TIME.

APRIL.

d h m s		d h m s		d h m s		d h m s	
1 6 18 36	I. Tr. I.	5 19 22 41	I. Ec. R.	11 23 33 22	I. Tr. E.	17 5 17 10	
6 57 29	I. Sh. I.					7 5 13	
8 29 45	I. Tr. E.	6 13 50 15	I. Tr. I.	12 0 0 39	I. Sh. E.	7 27 12	
9 7 17	I. Sh. E.	14 24 2	I. Sh. I.	9 3 1	III. Tr. I.	23 16 55	
14 12 12	III. Oc. D.	16 1 26	I. Tr. E.	11 4 11	III. Tr. E.		
16 16 30	III. Oc. R.	16 33 55	I. Sh. E.	11 6 13	III. Sh. I.	18 2 12 3	
16 57 32	III. Ec. D.			12 43 33	III.*Sh. E.	2 35 22	
18 37 19	III. Ec. R.	7 6 57 57	II. Oc. D.	15 22 40	II. Tr. I.	4 43 33	
23 8 28	II. Tr. I.	10 38 26	II. Ec. R.	16 18 9	II. Sh. I.	23 24 41	
		11 9 15	I. Oc. D.	17 56 44	II. Tr. E.	23 46 3	
2 0 24 44	II. Sh. I.	13 51 24	I. Ec. R.	18 40 38	I. Oc. D.		
1 43 0	II. Tr. E.			18 48 1	II. Sh. E.	19 1 35 56	
2 54 40	II. Sh. E.	8 8 20 54	I. Tr. I.	21 17 30	I. Ec. R.	1 56 7	
3 37 55	I. Oc. D.	8 52 58	I. Sh. I.			13 35 12	I
6 25 14	I. Ec. R.	10 32 7	I. Tr. E.	13 15 52 41	I. Tr. I.	15 8 16	I
		11 2 53	I. Sh. E.	16 19 27	I. Sh. I.	15 35 26	I
3 0 49 7	I. Tr. I.	18 41 41	III. Oc. D.	18 3 55	I. Tr. E.	16 45 50	I
1 26 20	I. Sh. I.	20 45 3	III. Oc. R.	18 29 27	I. Sh. E.	18 12 25	
3 0 17	I. Tr. E.	20 58 22	III. Ec. D.			18 53 34	
3 36 9	I. Sh. E.	22 38 15	III. Ec. R.	14 9 50 47	II. Oc. D.	20 42 33	
17 31 21	II. Oc. D.			13 11 7	I. Oc. D.	20 46 8	
21 18 54	II. Ec. R.	9 1 57 51	II. Tr. I.	13 16 42	II. Ec. R.	21 23 23	
22 8 20	I. Oc. D.	3 0 22	II. Sh. I.	15 46 12	I. Ec. R.	23 12 14	
		4 32 5	II. Tr. E.				
4 0 53 56	I. Ec. R.	5 30 17	II. Sh. E.	15 10 23 22	I. Tr. I.	20 17 55 15	
19 19 44	I. Tr. I.	5 39 42	I. Oc. D.	10 48 23	I. Sh. I.	18 14 49	
19 55 14	I. Sh. I.	8 20 6	I. Ec. R.	12 34 37	I.*Tr. E.	20 6 30	
21 30 55	I. Tr. E.			12 58 23	I. Sh. E.	20 24 53	
22 5 6	I. Sh. E.	10 2 51 28	I. Tr. I.	23 12 6	III. Oc. D.		
		3 21 47	I. Sh. I.			21 12 43 58	
5 4 32 4	III. Tr. I.	5 2 41	I. Tr. E.	16 2 39 16	III. Ec. R.	15 13 2	
6 34 8	III. Tr. E.	5 31 43	I. Sh. E.	4 47 30	II. Tr. I.	15 54 54	
7 4 31	III. Sh. I.	20 23 55	II. Oc. D.	5 35 50	II. Sh. I.	17 40 55	
8 41 40	III. Sh. E.	23 57 10	II. Ec. R.	7 21 24	II. Tr. E.		
12 33 9	II.*Tr. I.			7 41 35	I. Oc. D.	22 12 25 58	
13 42 36	II. Sh. I.	11 0 10 9	I. Oc. D.	8 5 42	II. Sh. E.	12 43 43	
15 7 32	II. Tr. E.	2 48 47	I. Ec. R.	10 14 52	I. Ec. R.	14 37 13	
16 12 31	II. Sh. E.	21 22 8	I. Tr. I.			14 53 48	
16 38 48	I. Oc. D.	21 50 41	I. Sh. I.	17 4 53 58	I. Tr. I.		

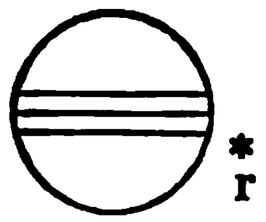
By reason of the proximity of Jupiter to the Sun the phenomen
satellites are not given from April 23 to May 31.

NOTE.—I. denotes ingress; E., egress; D., disappearance; R., reappearance; Ec., eclipse; Oc
Tr., transit of the satellite; Sh., transit of the shadow. *Visible at Washington.

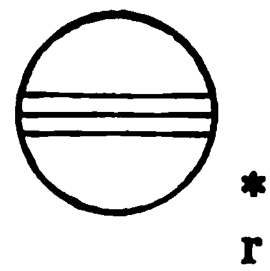
GREENWICH MEAN TIME.

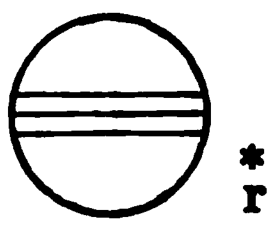
APRIL.

'hases of the Eclipses of the Satellites for an Inverting Telescope.

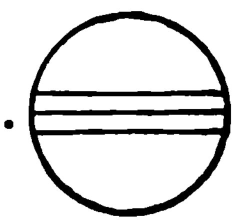


III.

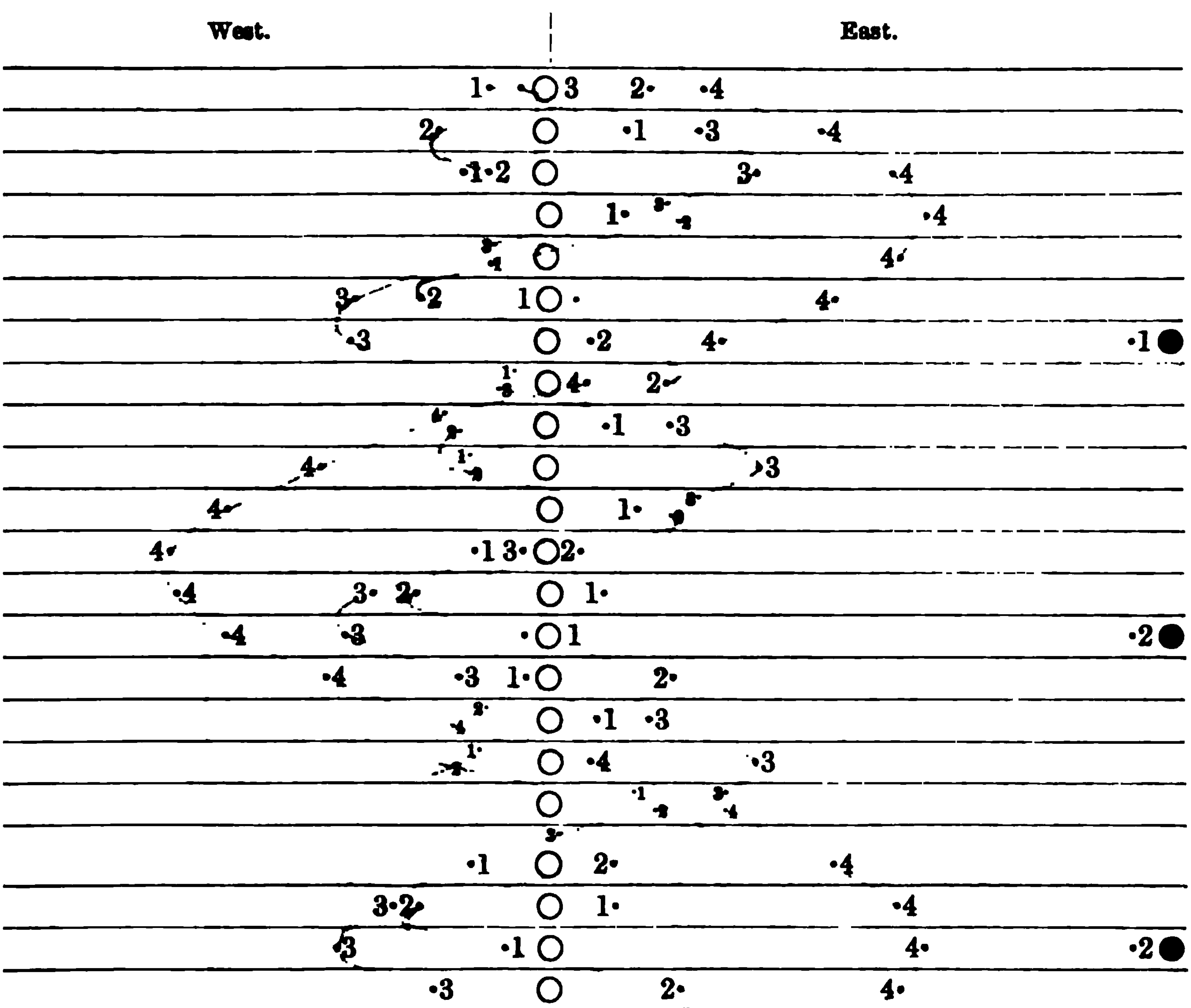




IV. No Eclipse.



Configurations at 12h 45m for an Inverting Telescope.



GREENWICH MEAN TIME.

JUNE.

d	h m s	
1	8 29 21	I. Ec. D.
	10 23 29	II. Sh. I.
	11 3 8	I. Oc. R.
	11 10 13	II. Tr. I.
	12 52 51	II. Sh. E.
	13 41 33	II. Tr. E.
	15 14 52	III. Sh. I.
	16 46 35	III. Tr. I.
	16 54 22	III. Sh. E.
	18 41 10	III. Tr. E.
2	5 45 26	I. Sh. I.
	6 10 8	I. Tr. I.
	7 55 29	I. Sh. E.
	8 20 57	I. Tr. E.
3	2 57 55	I. Ec. D.
	5 10 53	II. Ec. D.
	5 33 28	I. Oc. R.
	8 36 32	II. Oc. R.
4	0 14 13	I. Sh. I.
	0 40 40	I. Tr. I.
	2 24 15	I. Sh. E.
	2 51 28	I. Tr. E.
	21 26 26	I. Ec. D.
	23 40 54	II. Sh. I.
5	0 3 45	I. Oc. R.
	0 34 41	II. Tr. I.
	2 10 13	II. Sh. E.
	3 5 47	II. Tr. E.
	5 4 1	III. Ec. D.
	6 46 12	III. Ec. R.
	6 50 15	III. Oc. D.
	8 46 11	III. Oc. R.
	18 42 53	I. Sh. I.
	19 11 6	I. Tr. I.
	20 52 54	I. Sh. E.
	21 21 51	I. Tr. E.
6	15 54 58	I. Ec. D.
	18 29 15	II. Ec. D.
	18 34 1	I. Oc. R.
	22 1 56	II. Oc. R.
7	13 11 39	I. Sh. I.
	13 41 36	I. Tr. I.
	15 21 39	I. Sh. E.
	15 52 19	I. Tr. E.
8	10 23 30	I. Ec. D.
	12 58 19	II. Sh. I.
	13 4 16	I. Oc. R.
	13 59 2	II. Tr. I.
	15 27 33	II. Sh. E.
	16 29 56	II. Tr. E.
	19 16 6	III. Sh. I.
	20 56 6	III. Sh. E.
	21 17 12	III. Tr. I.

d	h m s	
8	23 11 2	III. Tr. E.
9	7 40 17	I. Sh. I.
	8 11 58	I. Tr. I.
	9 50 16	I. Sh. E.
	10 22 38	I. Tr. E.
10	4 52 2	I. Ec. D.
	7 34 32	I. Oc. R.
	7 48 28	II. Ec. D.
	11 28 1	II. Oc. R.
11	2 9 3	I. Sh. I.
	2 42 26	I. Tr. I.
	4 18 59	I. Sh. E.
	4 53 4	I. Tr. E.
	23 20 33	I. Ec. D.
12	2 4 44	I. Oc. R.
	2 15 43	II. Sh. I.
	3 23 19	II. Tr. I.
	4 44 54	II. Sh. E.
	5 53 58	II. Tr. E.
	9 4 16	III. Ec. D.
	10 46 56	III. Ec. R.
	11 19 23	III. Oc. D.
	13 14 38	III. Oc. R.
	20 37 42	I. Sh. I.
	21 12 47	I. Tr. I.
	22 47 37	I. Sh. E.
	23 23 22	I. Tr. E.
13	17 49 3	I. Ec. D.
	20 34 56	I. Oc. R.
	21 6 46	II.*Ec. D.
14	0 53 8	II. Oc. R.
	15 6 27	I. Sh. I.
	15 43 13	I. Tr. I.
	17 16 21	I. Sh. E.
	17 53 45	I. Tr. E.
15	12 17 34	I. Ec. D.
	15 5 6	I. Oc. R.
	15 33 5	II. Sh. I.
	16 47 25	II. Tr. I.
	18 2 12	II. Sh. E.
	19 17 53	II. Tr. E.
	23 16 41	III. Sh. I.
16	0 57 11	III. Sh. E.
	1 46 13	III. Tr. I.
	3 39 20	III. Tr. E.
	9 35 4	I. Sh. I.
	10 13 30	I. Tr. I.
	11 44 57	I. Sh. E.
	12 23 59	I. Tr. E.
17	6 46 5	I. Ec. D.
	9 35 18	I. Oc. R.

d	h m s	
17	10 25 55	II. Ec. D.
	14 18 53	II. Oc. R.
18	4 3 48	I. Sh. I.
	4 43 52	I. Tr. I.
	6 13 38	I. Sh. E.
	6 54 19	I. Tr. E.
19	1 14 35	I. Ec. D.
	4 5 25	I. Oc. R.
	4 50 28	II. Sh. I.
	6 11 27	II. Tr. I.
	7 19 32	II. Sh. E.
	8 41 40	II. Tr. E.
	13 5 6	III. Ec. D.
	14 48 15	III. Ec. R.
	15 48 6	III. Oc. D.
	17 42 41	III. Oc. R.
	22 32 26	I. Sh. I.
	23 14 7	I. Tr. I.
20	0 42 15	I. Sh. E.
	1 24 31	I. Tr. E.
	19 43 5	I. Ec. D.
	22 35 33	I. Oc. R.
	23 44 8	II. Ec. D.
21	3 43 38	II. Oc. R.
	17 1 10	I. Sh. I.
	17 44 28	I. Tr. I.
	19 10 58	I. Sh. E.
	19 54 49	I. Tr. E.
22	14 11 34	I. Ec. D.
	17 5 38	I. Oc. R.
	18 7 51	II. Sh. I.
	19 35 18	II. Tr. I.
	20 36 51	II.*Sh. E.
	22 5 19	II. Tr. E.
23	3 16 58	III. Sh. I.
	4 58 0	III. Sh. E.
	6 13 47	III. Tr. I.
	8 6 13	III. Tr. E.
	11 29 46	I. Sh. I.
	12 14 39	I. Tr. I.
	13 39 32	I. Sh. E.
	14 24 56	I. Tr. E.
24	8 40 5	I. Ec. D.
	11 35 45	I. Oc. R.
	13 3 9	II. Ec. D.
	17 8 55	II. Oc. R.
25	5 58 28	I. Sh. I.
	6 44 54	I. Tr. I.
	8 8 12	I. Sh. E.
	8 55 9	I. Tr. E.
26	3 8 34	I. Ec. D.

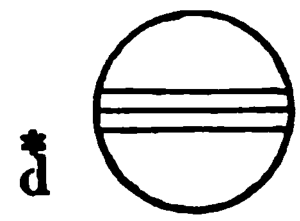
d	h m s	
26	6 5 47	I.
	7 25 17	II.
	8 59 4	II.
	9 54 13	II.
	11 28 51	II.
	17 5 16	III
	18 48 59	III
	20 14 50	III
	22 8 52	III
27	0 27 5	I
	1 15 3	I
	2 36 47	I
	3 25 15	I
	21 37 3	I
28	0 35 49	I
	2 21 18	II
	6 33 15	II
	18 55 48	I
	19 45 17	I
	21 5 28	I
	21 55 26	I
29	16 5 31	I
	19 5 48	I
	20 42 39	II
	22 22 36	II
	23 11 33	II
30	0 52 12	II
	7 17 9	III
	8 58 42	III
	10 39 54	III
	12 31 40	III
	13 24 22	I
	14 15 21	I
	15 34 1	
	16 25 26	

NOTE.—I. denotes ingress; E., egress; D., disappearance; R., reappearance; Ec., eclipse; Oc., (
Tr., transit of the satellite; Sh., transit of the shadow. *Visible at Washington.

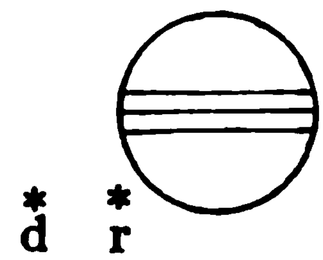
GREENWICH MEAN TIME.

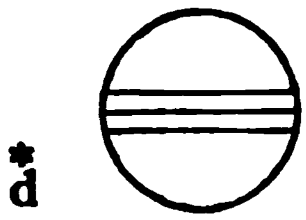
JUNE.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

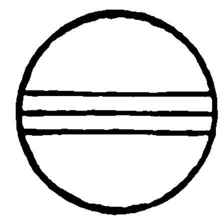


III.



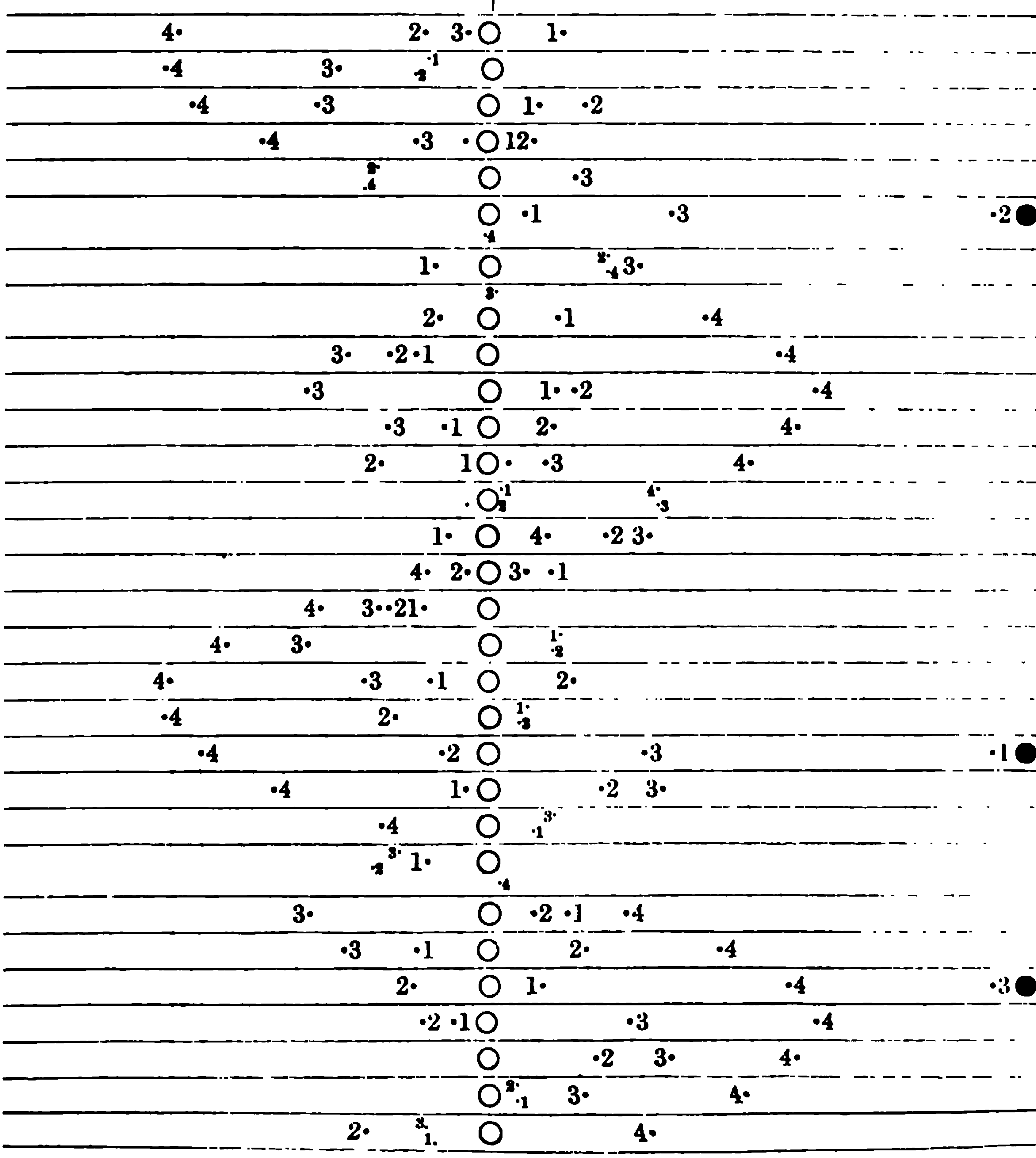


IV. No Eclipse.



Configurations at 20h 45m for an Inverting Telescope.

West. East.



GREENWICH MEAN TIME.

JULY.

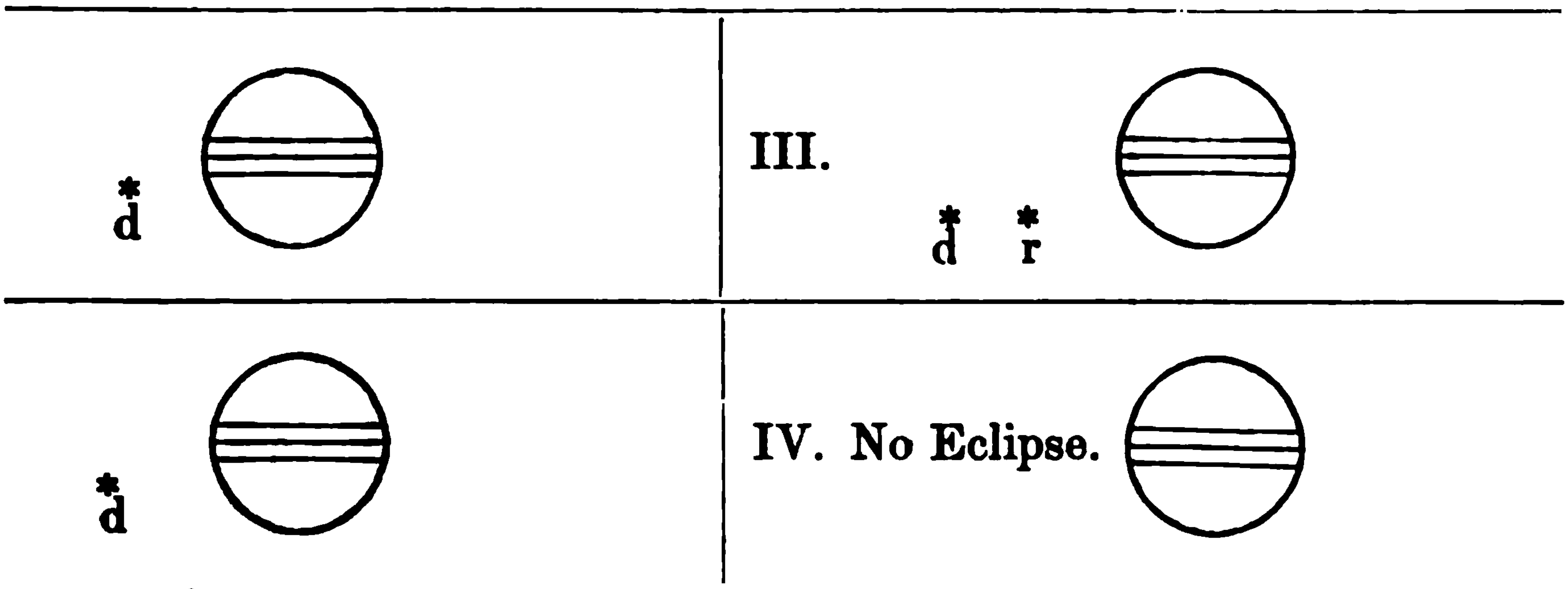
d	h m s	Phenomenon
1	10 34 1	I. Ec. D.
	13 35 49	I. Oc. R.
	15 40 13	II. Ec. D.
	19 58 2	II.*Oc. R.
2	7 53 4	I. Sh. I.
	8 45 29	I. Tr. I.
	10 2 40	I. Sh. E.
	10 55 31	I. Tr. E.
3	5 2 29	I. Ec. D.
	8 5 45	I. Oc. R.
	10 0 5	II. Sh. I.
	11 46 0	II. Tr. I.
	12 28 55	II. Sh. E.
	14 15 22	II. Tr. E.
	21 5 29	III.*Ec. D.
	22 49 51	III. Ec. R.
4	0 40 6	III. Oc. D.
	2 21 39	I. Sh. I.
	2 33 40	III. Oc. R.
	3 15 31	I. Tr. I.
	4 31 14	I. Sh. E.
	5 25 30	I. Tr. E.
	23 30 57	I. Ec. D.
5	2 35 41	I. Oc. R.
	4 58 20	II. Ec. D.
	9 21 55	II. Oc. R.
	20 50 21	I.*Sh. I.
	21 45 37	I. Tr. I.
	22 59 53	I. Sh. E.
	23 55 33	I. Tr. E.
6	17 59 25	I. Ec. D.
	21 5 34	I.*Oc. R.
	23 17 29	II. Sh. I.
7	1 9 11	II. Tr. I.
	1 46 15	II. Sh. E.
	3 38 22	II. Tr. E.
	11 17 14	III. Sh. I.
	12 59 21	III. Sh. E.
	15 4 17	III. Tr. I.
	15 18 54	I. Sh. I.
	16 15 34	I. Tr. I.
	16 55 28	III. Tr. E.
	17 28 25	I. Sh. E.
	18 25 27	I. Tr. E.
8	12 27 55	I. Ec. D.
	15 35 28	I. Oc. R.
	18 17 6	II.*Ec. D.
	22 46 8	II. Oc. R.
9	9 47 34	I. Sh. I.
	10 45 34	I. Tr. I.
	11 57 2	I. Sh. E.
	12 55 23	I. Tr. E.
10	6 56 22	I. Ec. D
10	10 5 18	I. Oc. R.
	12 34 56	II. Sh. I.
	14 32 13	II. Tr. I.
	15 3 39	II. Sh. E.
	17 1 9	II. Tr. E.
11	1 4 58	III. Ec. D.
	2 50 1	III. Ec. R.
	4 16 8	I. Sh. I.
	5 2 58	III. Oc. D.
	5 15 28	I. Tr. I.
	6 25 35	I. Sh. E.
	6 56 6	III. Oc. R.
	7 25 15	I. Tr. E.
12	1 24 50	I. Ec. D.
	4 35 7	I. Oc. R.
	7 35 9	II. Ec. D.
	12 9 28	II. Oc. R.
	22 44 49	I. Sh. I.
	23 45 26	I. Tr. I.
13	0 54 13	I. Sh. E.
	1 55 9	I. Tr. E.
	19 53 16	I.*Ec. D.
	23 4 52	I. Oc. R.
14	1 52 23	II. Sh. I.
	3 55 3	II. Tr. I.
	4 21 3	II. Sh. E.
	6 23 48	II. Tr. E.
	15 17 53	III. Sh. I.
	17 0 36	III. Sh. E.
	17 13 21	I. Sh. I.
	18 15 14	I. Tr. I.
	19 22 43	I.*Sh. E.
	19 27 24	III.*Tr. I.
	20 24 54	I.*Tr. E.
	21 18 3	III.*Tr. E.
15	14 21 46	I. Ec. D.
	17 34 40	I. Oc. R.
	20 53 48	II.*Ec. D.
16	1 33 3	II. Oc. R.
	11 41 59	I. Sh. I.
	12 45 6	I. Tr. I.
	13 51 19	I. Sh. E.
	14 54 43	I. Tr. E.
17	8 50 12	I. Ec. D.
	12 4 22	I. Oc. R.
	15 9 49	II. Sh. I.
	17 17 36	II. Tr. I.
	17 38 26	II. Sh. E.
	19 46 8	II.*Tr. E.
18	5 4 19	III. Ec. D.
	6 10 32	I. Sh. I.
	6 50 4	III. Ec. R.
	7 14 51	I. Tr. I.
	8 19 51	I. Sh. E.
18	9 23 46	III. Oc. D.
	9 24 25	I. Tr. E.
	11 16 30	III. Oc. R.
19	3 18 39	I. Ec. D.
	6 34 3	I. Oc. R.
	10 11 47	II. Ec. D.
	14 55 49	II. Oc. R.
20	0 39 11	I. Sh. I.
	1 44 40	I. Tr. I.
	2 48 27	I. Sh. E.
	3 54 11	I. Tr. E.
	21 47 5	I. Ec. D.
21	1 3 40	I. Oc. R.
	4 27 18	II. Sh. I.
	6 39 59	II. Tr. I.
	6 55 53	II. Sh. E.
	9 8 19	II. Tr. E.
	19 7 42	I.*Sh. I.
	19 18 1	III.*Sh. I.
	20 14 19	I.*Tr. I.
	21 1 25	III.*Sh. E.
	21 16 56	I.*Sh. E.
	22 23 46	I. Tr. E.
	23 47 53	III. Tr. I.
22	1 38 2	III. Tr. E.
	16 15 34	I. Ec. D.
	19 33 20	I.*Oc. R.
	23 30 19	II. Ec. D.
23	4 18 43	II. Oc. R.
	13 36 19	I. Sh. I.
	14 44 1	I. Tr. I.
	15 45 31	I. Sh. E.
	16 53 25	I. Tr. E.
24	10 44 0	I. Ec. D.
	14 2 53	I. Oc. R.
	17 44 45	II. Sh. I.
	20 2 0	II.*Tr. I.
	20 13 18	II.*Sh. E.
	22 30 9	II. Tr. E.
25	8 4 51	I. Sh. I.
	9 3 52	III. Ec. D.
	9 13 37	I. Tr. I.
	10 14 1	I. Sh. E.
	10 50 19	III. Ec. R.
	11 22 57	I. Tr. E.
	13 42 40	III. Oc. D.
	15 34 58	III. Oc. R.
26	5 12 28	I. Ec. D.
	8 32 26	I. Oc. R.
	12 48 13	II. Ec. D.
	17 40 47	II. Oc. R.
27	2 33 28	I. Sh. I.
	3 43 15	I. Tr. I.
27	4 42 37	I
	5 52 33	I
	23 40 53	I
28	3 1 54	I
	7 2 19	II
	9 23 55	II
	9 30 49	II
	11 51 52	II
	21 1 58	
	22 12 44	
	23 11 5	
	23 18 26	III
29	0 21 59	
	1 2 35	II
	4 6 11	II
	5 55 53	II
	18 9 21	
	21 31 24	
30	2 6 37	I
	7 2 56	I
	15 30 33	
	16 42 15	
	17 39 38	
	18 51 27	
31	12 37 47	
	16 0 48	
	20 19 47	I
	22 45 12	I
	22 48 16	I

NOTE.—I. denotes ingress; E., egress; D., disappearance; R., reappearance; Ec., eclipse; Oc.. Tr., transit of the satellite; Sh., transit of the shadow. *Visible at Washington.

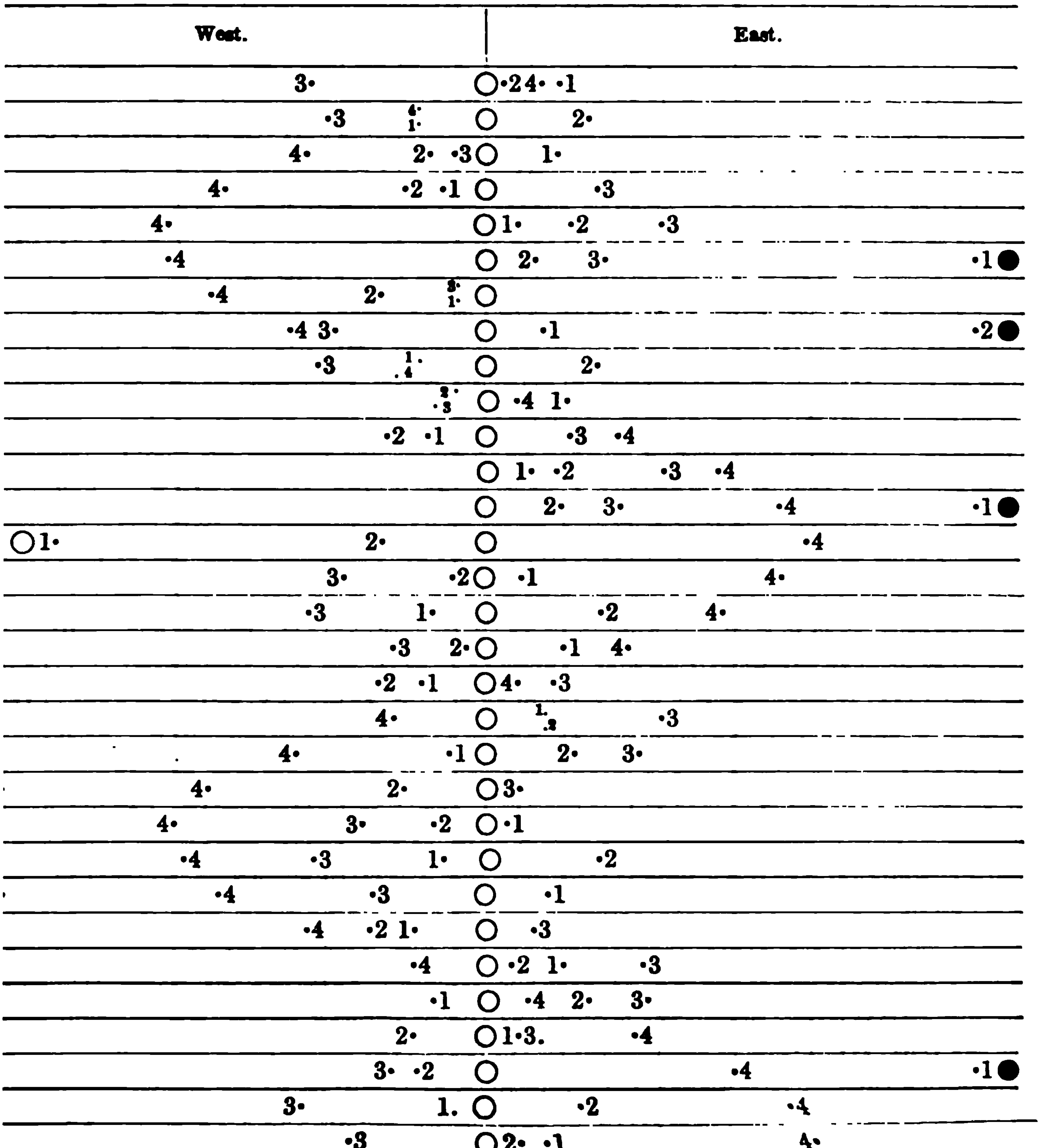
GREENWICH MEAN TIME.

JULY.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



Configurations at 20ʰ 15ᵐ for an Inverting Telescope.



GREENWICH MEAN TIME.

AUGUST.

d	h	m	s	
1	1	13	8	II. Tr. E.
	9	59	4	I. Sh. I.
	11	11	40	I. Tr. I.
	12	8	6	I. Sh. E.
	13	3	35	III. Ec. D.
	13	20	49	I. Tr. E.
	14	50	46	III. Ec. R.
	17	59	13	III. Oc. D.
	19	51	5	III.*Oc. R.
2	7	6	14	I. Ec. D.
	10	30	12	I. Oc. R.
	15	24	27	II. Ec. D.
	20	24	17	II.*Oc. R.
3	4	27	39	I. Sh. I.
	5	41	7	I. Tr. I.
	6	36	41	I. Sh. E.
	7	50	13	I. Tr. E.
4	1	34	39	I. Ec. D.
	4	59	30	I. Oc. R.
	9	37	22	II. Sh. I.
	12	5	50	II. Sh. E.
	12	6	41	II. Tr. I.
	14	34	17	II. Tr. E.
	22	56	8	I. Sh. I.
5	0	10	25	I. Tr. I.
	1	5	8	I. Sh. E.
	2	19	29	I. Tr. E.
	3	18	14	III. Sh. I.
	5	3	8	III. Sh. E.
	8	21	18	III. Tr. I.
	10	10	31	III. Tr. E.
	20	3	8	I.*Ec. D.
	23	28	50	I. Oc. R.
6	4	42	45	II. Ec. D.
	7	13	22	II. Ec. R.
	7	16	18	II. Oc. D.
	9	45	38	II. Oc. R.
	17	24	42	I. Sh. I.
	18	39	45	I.*Tr. I.
	19	33	40	I.*Sh. E.
	20	48	45	I.*Tr. E.
7	14	31	33	I. Ec. D.
	17	58	3	I.*Oc. R.
	22	54	52	II. Sh. I.
8	1	23	18	II. Sh. E.
	1	27	30	II. Tr. I.
	3	54	55	II. Tr. E.
	11	53	11	I. Sh. I.
	13	8	58	I. Tr. I.
	14	2	7	I. Sh. E.
	15	17	56	I. Tr. E.
	17	3	54	III. Ec. D.
	18	51	52	III.*Ec. R.

d	h	m	s	
8	22	13	38	III. Oc. D.
9	0	5	4	III. Oc. R.
	9	0	0	I. Ec. D.
	12	27	17	I. Oc. R.
	18	0	30	II.*Ec. D.
	20	31	5	II.*Ec. R.
	20	37	5	II.*Oc. D.
	23	6	13	II. Oc. R.
10	6	21	45	I. Sh. I.
	7	38	14	I. Tr. I.
	8	30	40	I. Sh. E.
	9	47	9	I. Tr. E.
11	3	28	24	I. Ec. D.
	6	56	24	I. Oc. R.
	12	12	32	II. Sh. I.
	14	40	58	II. Sh. E.
	14	48	12	II. Tr. I.
	17	15	28	II. Tr. E.
12	0	50	12	I. Sh. I.
	2	7	20	I. Tr. I.
	2	59	6	I. Sh. E.
	4	16	12	I. Tr. E.
	7	17	45	III. Sh. I.
	9	3	28	III. Sh. E.
	12	33	16	III. Tr. I.
	14	22	0	III. Tr. E.
	21	56	53	I. Ec. D.
13	1	25	33	I. Oc. R.
	7	18	40	II. Ec. D.
	9	49	10	II. Ec. R.
	9	57	45	II. Oc. D.
	12	26	40	II. Oc. R.
	19	18	45	I.*Sh. I.
	20	36	27	I.*Tr. I.
	21	27	37	I.*Sh. E.
	22	45	18	I. Tr. E.
14	16	25	18	I. Ec. D.
	19	54	35	I.*Oc. R.
15	1	30	4	II. Sh. I.
	3	58	29	II. Sh. E.
	4	8	19	II. Tr. I.
	6	35	25	II. Tr. E.
	13	47	12	I. Sh. I.
	15	5	28	I. Tr. I.
	15	56	4	I. Sh. E.
	17	14	15	I. Tr. E.
	21	3	35	III.*Ec. D.
	22	52	23	III. Ec. R.
16	2	24	16	III. Oc. D.
	4	15	20	III. Oc. R.
	10	53	45	I. Ec. D.
	14	23	37	I. Oc. R.

d	h	m	s	
16	20	36	21	II.*Ec. D.
	23	6	50	II. Ec. R.
	23	17	40	II. Oc. D.
17	1	46	23	II. Oc. R.
	8	15	46	I. Sh. I.
	9	34	31	I. Tr. I.
	10	24	35	I. Sh. E.
	11	43	16	I. Tr. E.
18	5	22	9	I. Ec. D.
	8	52	32	I. Oc. R.
	14	47	47	II. Sh. I.
	17	16	14	II.*Sh. E.
	17	28	20	II.*Tr. I.
	19	55	17	II.*Tr. E.
19	2	44	11	I. Sh. I.
	4	3	23	I. Tr. I.
	4	53	1	I. Sh. E.
	6	12	7	I. Tr. E.
	11	17	13	III. Sh. I.
	13	3	45	III. Sh. E.
	16	42	5	III. Tr. I.
	18	30	16	III.*Tr. E.
	23	50	39	I. Ec. D.
20	3	21	29	I. Oc. R.
	9	54	23	II. Ec. D.
	12	24	48	II. Ec. R.
	12	37	22	II. Oc. D.
	15	5	53	II. Oc. R.
	21	12	42	I.*Sh. I.
	22	32	18	I. Tr. I.
	23	21	31	I. Sh. E.
21	0	40	59	I. Tr. E.
	18	19	4	I.*Ec. D.
	21	50	19	I.*Oc. R.
22	4	5	20	II. Sh. I.
	6	33	47	II. Sh. E.
	6	47	37	II. Tr. I.
	9	14	25	II. Tr. E.
	15	41	9	I. Sh. I.
	17	1	5	I.*Tr. I.
	17	49	57	I.*Sh. E.
	19	9	43	I.*Tr. E.
23	1	3	20	III. Ec. D.
	2	53	1	III. Ec. R.
	6	31	35	III. Oc. D.
	8	22	6	III. Oc. R.
	12	47	31	I. Ec. D.
	16	19	8	I. Oc. R.
	23	12	3	II. Ec. D.
24	1	42	26	II. Ec. R.
	1	56	23	II. Oc. D.
	4	24	43	II. Oc. R.

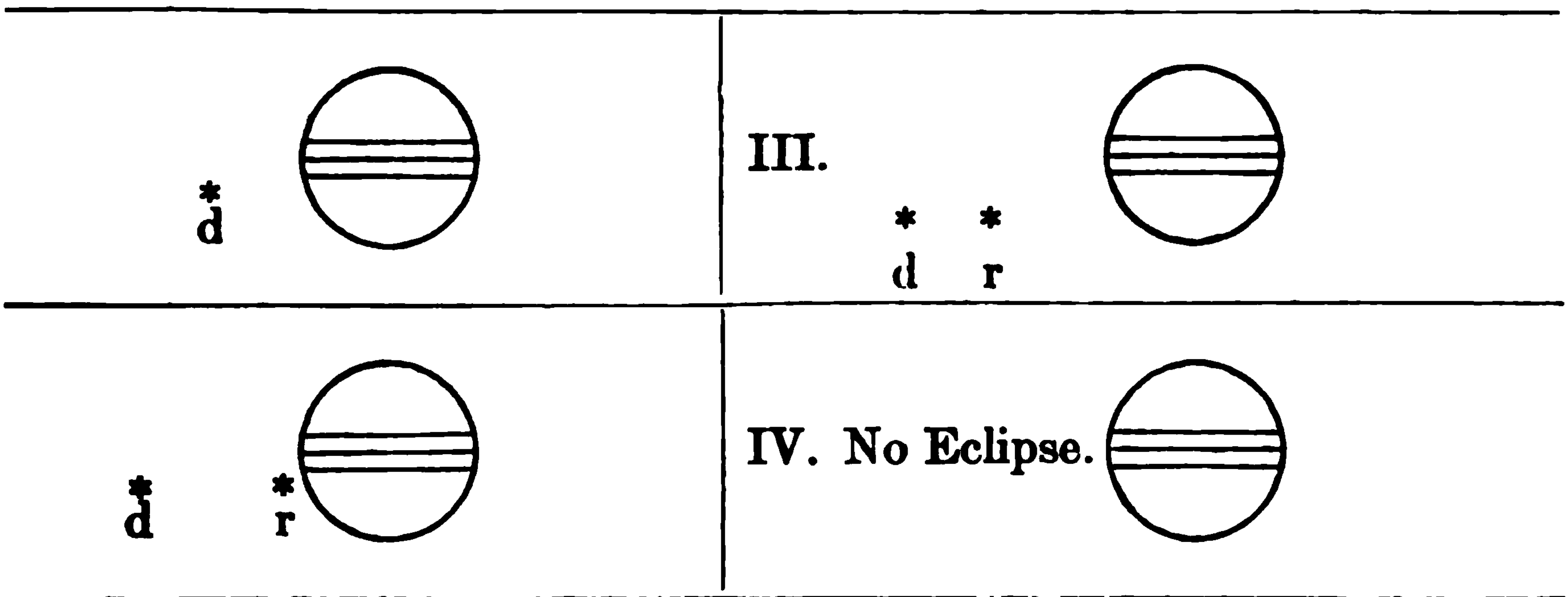
d	h	m	s	
24	10	9	41	I. S
	11	29	54	I. T
	12	18	27	I. S
	13	38	30	I. T
25	7	15	55	I. E
	10	47	50	I. O
	17	23	7	II.*S
	19	51	37	II.*S
	20	6	49	II.*T
	22	33	31	II. T
26	4	38	6	I. S
	5	58	32	I. T
	6	46	52	I. S
	8	7	8	I. T
	15	16	36	III. S
	17	4	2	III.*S
	20	47	17	III.*T
	22	34	52	III. T
27	1	44	25	I. E
	5	16	34	I. O
	12	29	56	II. E
	15	0	16	II. E
	15	15	4	II. O
	17	43	12	II.*O
	23	6	35	I. Sl
28	0	27	12	I. T
	1	15	21	I. Sl
	2	35	45	I. T
	20	12	50	I.*E
	23	45	10	I. O
29	6	40	42	II. Sl
	9	9	13	II. Sl
	9	25	15	II. T
	11	51	49	II. T
	17	35	1	I.*Sl
	18	55	45	I.*T
	19	43	46	I.*Sl
	21	4	16	I.*T
30	5	2	26	III. E
	6	53	1	III. E
	10	34	37	III. O
	12	24	34	III. O
	14	41	18	I. E
	18	13	46	I.*O
31	1	47	31	II. E
	4	17	49	II. E
	4	33	3	II. O
	7	1	1	II. O
	12	3	32	I. S
	13	24	19	I. T
	14	12	16	I. S
	15	32	48	I. T

NOTE.—I. denotes ingress; E., egress; D., disappearance; R., reappearance; Ec., eclipse; Oc., occul
Tr., *transit of the satellite*; Sh., transit of the shadow. *Visible at Washington.

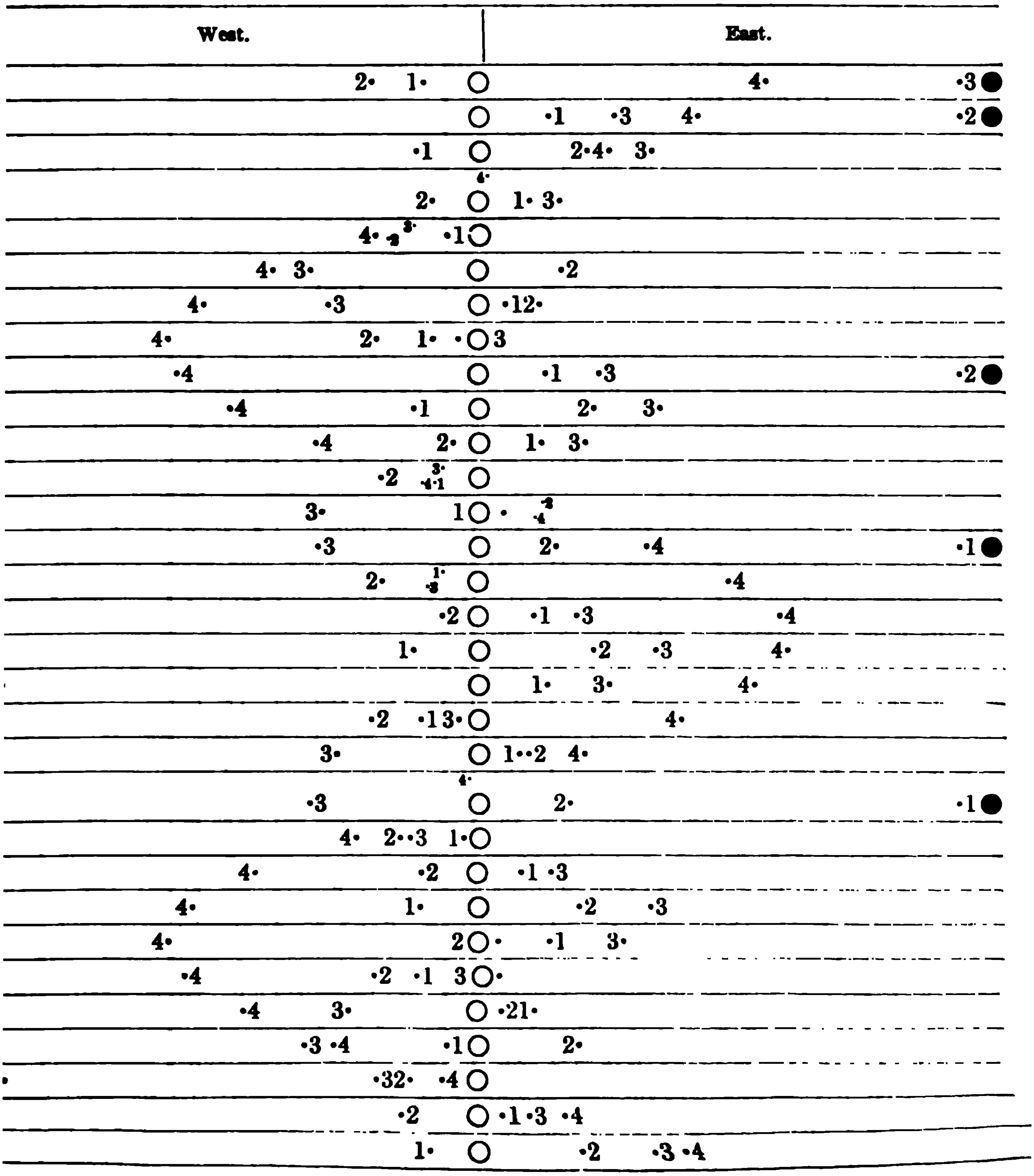
GREENWICH MEAN TIME.

AUGUST.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



Configurations at 19h 30m for an Inverting Telescope.



GREENWICH MEAN TIME.

SEPTEMBER.

d	h m s	
1	9 9 42	I. Ec. D.
	12 42 14	I. Oc. R.
	19 58 36	II.*Sh. I.
	22 27 10	II. Sh. E.
	22 43 39	II. Tr. I.
2	1 10 7	II. Tr. E.
	6 31 56	I. Sh. I.
	7 52 44	I. Tr. I.
	8 40 40	I. Sh. E.
	10 1 12	I. Tr. E.
	19 16 35	III.*Sh. I.
	21 4 56	III.*Sh. E.
3	0 49 17	III. Tr. I.
	2 36 14	III. Tr. E.
	3 38 12	I. Ec. D.
	7 10 45	I. Oc. R.
	15 5 18	II. Ec. D.
	17 35 32	II.*Ec. R.
	17 50 40	II.*Oc. D.
	20 18 26	II.*Oc. R.
4	1 0 23	I. Sh. I.
	2 21 7	I. Tr. I.
	3 9 8	I. Sh. E.
	4 29 35	I. Tr. E.
	22 6 37	I.*Ec. D.
5	1 39 6	I. Oc. R.
	9 16 11	II. Sh. I.
	11 44 48	II. Sh. E.
	12 1 7	II. Tr. I.
	14 27 28	II. Tr. E.
	19 28 48	I.*Sh. I.
	20 49 25	I.*Tr. I.
	21 37 33	I.*Sh. E.
	22 57 51	I. Tr. E.
6	9 1 27	III. Ec. D.
	10 52 58	III. Ec. R.
	14 33 40	III. Oc. D.
	16 22 59	III.*Oc. R.
	16 35 6	I.*Ec. D.
	20 7 28	I.*Oc. R.
7	4 22 51	II. Ec. D.
	6 53 3	II. Ec. R.
	7 7 37	II. Oc. D.
	9 35 13	II. Oc. R.
	13 57 18	I. Sh. I.
	15 17 43	I. Tr. I.
	16 6 2	I.*Sh. E.
	17 26 8	I.*Tr. E.
8	11 3 30	I. Ec. D.
	14 35 40	I. Oc. R.
	22 34 10	II. Sh. I.
9	1 2 51	II. Sh. E.
	1 18 35	II. Tr. I.
	3 44 51	II. Tr. E.

d	h m s	
9	8 25 41	I. Sh. I.
	9 45 53	I. Tr. I.
	10 34 26	I. Sh. E.
	11 54 17	I. Tr. E.
	23 16 4	III. Sh. I.
10	1 5 26	III. Sh. E.
	4 46 39	III. Tr. I.
	5 32 1	I. Ec. D.
	6 32 57	III. Tr. E.
	9 3 56	I. Oc. R.
	17 40 33	II.*Ec. D.
	20 10 42	II.*Ec. R.
	20 24 7	II.*Oc. D.
	22 51 31	II. Oc. R.
11	2 54 7	I. Sh. I.
	4 14 0	I. Tr. I.
	5 2 53	I. Sh. E.
	6 22 24	I. Tr. E.
12	0 0 27	I. Ec. D.
	3 32 2	I. Oc. R.
	11 51 46	II. Sh. I.
	14 20 32	II. Sh. E.
	14 35 1	II. Tr. I.
	17 1 12	II.*Tr. E.
	21 22 31	I.*Sh. I.
	22 42 2	I. Tr. I.
	23 31 18	I. Sh. E.
13	0 50 24	I. Tr. E.
	13 0 46	III. Ec. D.
	14 53 13	III. Ec. R.
	18 28 53	III.*Oc. D.
	18 28 56	I.*Ec. D.
	20 17 28	III.*Oc. R.
	22 0 9	I.*Oc. R.
14	6 58 0	II. Ec. D.
	9 28 9	II. Ec. R.
	9 39 57	II. Oc. D.
	12 7 11	II. Oc. R.
	15 50 59	I.*Sh. I.
	17 10 3	I.*Tr. I.
	17 59 46	I.*Sh. E.
	19 18 26	I.*Tr. E.
15	12 57 20	I. Ec. D.
	16 28 5	I.*Oc. R.
16	1 9 52	II. Sh. I.
	3 38 44	II. Sh. E.
	3 51 30	II. Tr. I.
	6 17 38	II. Tr. E.
	10 19 21	I. Sh. I.
	11 37 56	I. Tr. I.
	12 28 10	I. Sh. E.
	13 46 18	I. Tr. E.
17	3 15 50	III. Sh. I.
	5 6 18	III. Sh. E.

d	h m s	
17	7 25 52	I. Ec. D.
	8 39 52	III. Tr. I.
	10 25 30	III. Tr. E.
	10 56 5	I. Oc. R.
	20 15 37	II.*Ec. D.
	22 45 42	II. Ec. R.
	22 55 16	II. Oc. D.
18	1 22 20	II. Oc. R.
	4 47 47	I. Sh. I.
	6 5 47	I. Tr. I.
	6 56 37	I. Sh. E.
	8 14 8	I. Tr. E.
19	1 54 19	I. Ec. D.
	5 23 55	I. Oc. R.
	14 27 31	II. Sh. I.
	16 56 29	II.*Sh. E.
	17 6 53	II.*Tr. I.
	19 32 57	II.*Tr. E.
	23 16 10	I. Sh. I.
20	0 33 31	I. Tr. I.
	1 25 2	I. Sh. E.
	2 41 53	I. Tr. E.
	17 0 18	III.*Ec. D.
	18 53 43	III.*Ec. R.
	20 22 49	I.*Ec. D.
	22 19 44	III.*Oc. D.
	23 51 45	I. Oc. R.
21	0 7 31	III. Oc. R.
	9 33 2	II. Ec. D.
	12 3 6	II. Ec. R.
	12 9 54	II. Oc. D.
	14 36 50	II. Oc. R.
	17 44 37	I.*Sh. I.
	19 1 15	I.*Tr. I.
	19 53 30	I.*Sh. E.
	21 9 37	I.*Tr. E.
22	14 51 14	I. Ec. D.
	18 19 25	I.*Oc. R.
23	3 45 41	II. Sh. I.
	6 14 46	II. Sh. E.
	6 22 16	II. Tr. I.
	8 48 19	II. Tr. E.
	12 12 59	I. Sh. I.
	13 28 51	I. Tr. I.
	14 21 54	I. Sh. E.
	15 37 13	I.*Tr. E.
24	7 15 5	III. Sh. I.
	9 6 39	III. Sh. E.
	9 19 47	I. Ec. D.
	12 27 57	III. Tr. I.
	12 47 9	I. Oc. R.
	14 12 52	III. Tr. E.
	22 50 34	II. Ec. D.
25	1 20 35	II. Ec. R.

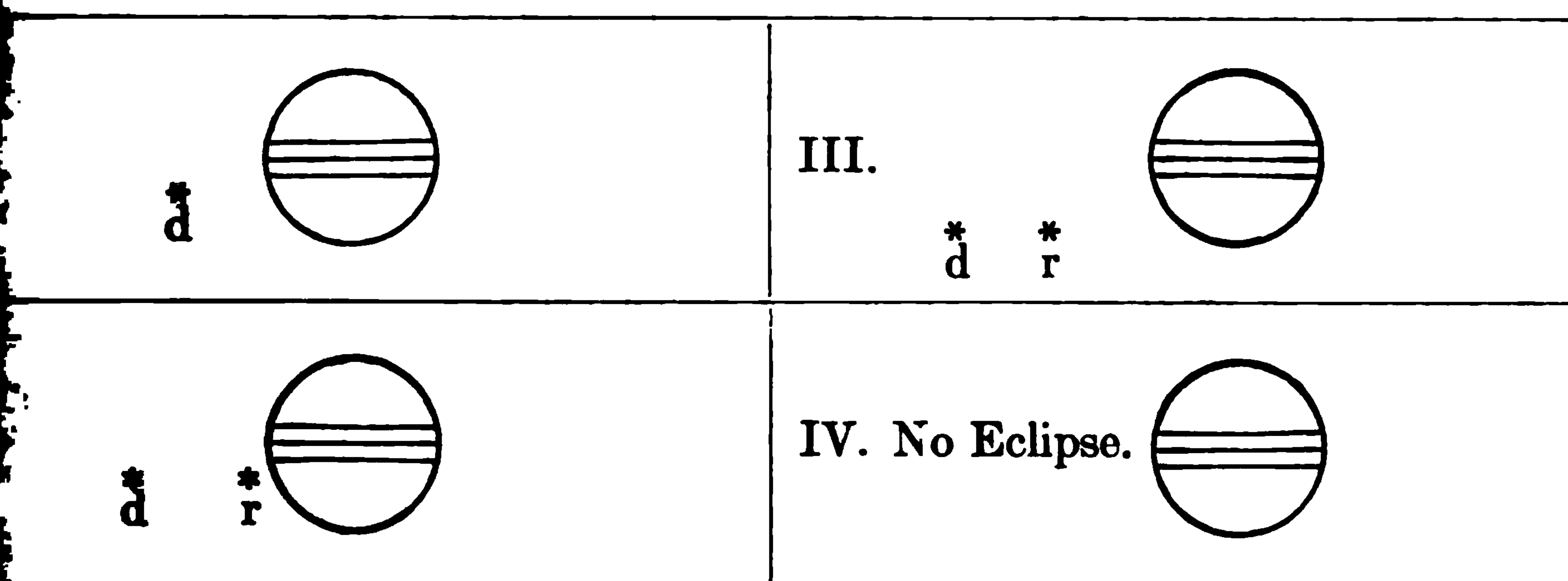
d	h m s	
25	1 24 2	II
	3 50 47	II
	6 41 24	I
	7 56 25	I
	8 50 20	I
	10 4 48	
26	3 48 14	
	7 14 42	
	17 3 23	I
	19 32 35	I
	19 36 30	I
	22 2 30	I
27	1 9 47	
	2 23 52	
	3 18 45	
	4 32 15	
	21 0 32	II
	22 16 46	
	22 54 57	II
28	1 42 15	
	2 6 33	II
	3 53 29	II
	12 7 57	I
	17 4 8	I
	19 38 13	
	20 51 19	
	21 47 13	
	22 59 42	
29	16 45 11	
	20 9 38	
30	6 21 39	I
	8 50 48	I
	8 51 0	I
	11 16 49	I
	14 6 36	
	15 18 38	
	16 15 38	
	17 27 2	

Note.—I. denotes ingress; E., egress; D., disappearance; R., reappearance; Ec., eclipse; Oc., Tr., transit of the satellite; Sh., transit of the shadow. *Visible at Washington.

GREENWICH MEAN TIME.

SEPTEMBER.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



Configurations at 19h 0m for an Inverting Telescope.

Day	West.		East.
1		○	2• •1 3• •4
2	2• 1•	○	3• •4
3	3•	○	1• 4• •2
4	3• •1	○	2• 4•
5	•3 2•	○	1• 4•
6	•2	○	•3 4• •1
7	4• 1.	○	•2 •3
8	4•	○	2• •1 3•
9	4• 2• 1•	○	3•
10	4• 3•	○	1• •2
11	•4 3• •1	○	2•
12	•4 •3 2•	○	1•
13	•4 •2	○	•1 ● •3
14	○1• •4	○	•2 •3
15		○ •4	•1 2• 3•
16	2• 1•	○	3• •4
17	3• •2	○	•1 •4
18	3• •1	○	•2 •4
19	○2• •3	○	1• •4
20	•2 •1 •3	○	4•
21	1	○	• •2 •3 4•
22		○	•1 2• 4•3•
23	2• 1•	○	4• 3•
24	4• •2 3•	○	•1
25	4•3• 1•	○	•2
26	4• •3 2	○	• 1•
27	4• •2 •1 •3	○	
28	•4	○	1• •2 •3
29	•4	○	2• •3
30	•4 2• 1•	○	3•

GREENWICH MEAN TIME.

OCTOBER.

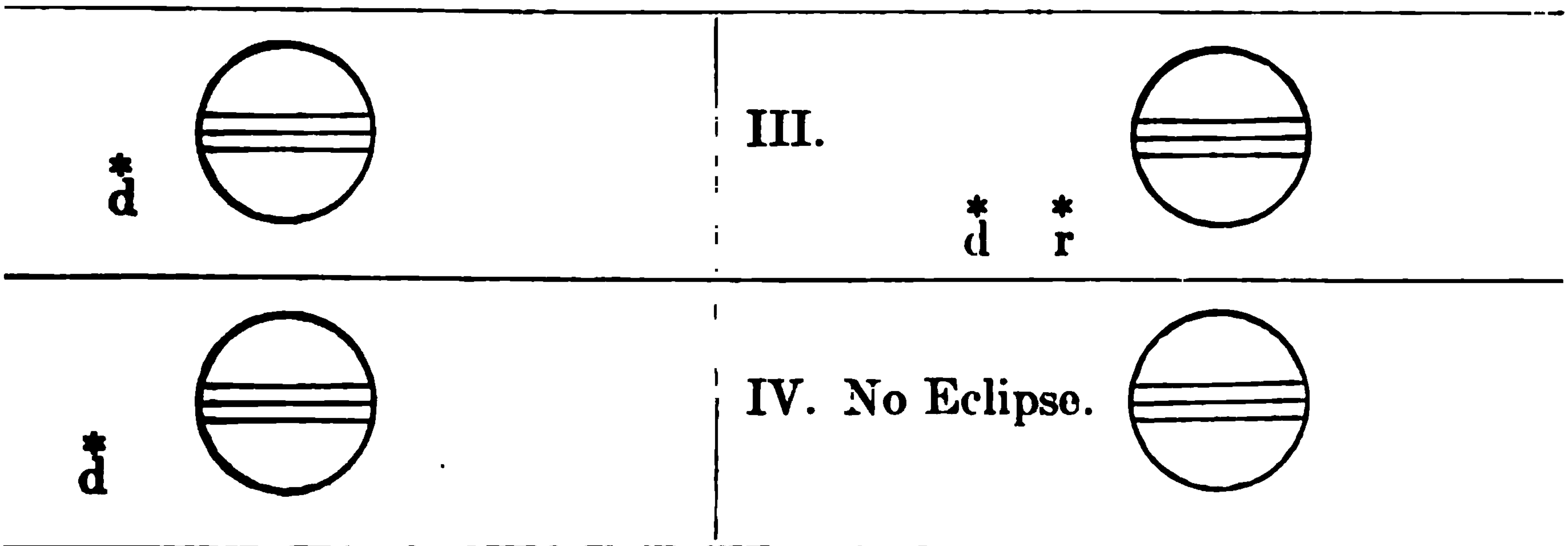
d	h m s	
1	11 13 45	I. Ec. D.
	11 14 6	III. Sh. I.
	13 6 51	III. Sh. E.
	14 37 5	I.*Oc. R.
	16 11 9	III.*Tr. I.
	17 55 19	III.*Tr. E.
2	1 25 23	II. Ec. D.
	6 16 52	II. Oc. R.
	8 35 0	I. Sh. I.
	9 45 54	I. Tr. I.
	10 44 4	I. Sh. E.
	11 54 20	I. Tr. E.
3	5 42 13	I. Ec. D.
	9 4 21	I. Oc. R.
	19 39 25	II.*Sh. I.
	22 3 54	II.*Tr. I.
	22 8 54	II.*Sh. E.
4	0 29 54	II. Tr. E.
	3 3 22	I. Sh. I.
	4 13 5	I. Tr. I.
	5 12 29	I. Sh. E.
	6 21 30	I. Tr. E.
5	0 10 46	I. Ec. D.
	1 0 10	III. Ec. D.
	2 55 38	III. Ec. R.
	3 31 38	I. Oc. R.
	5 47 52	III. Oc. D.
	7 33 58	III. Oc. R.
	14 42 45	II.*Ec. D.
	19 29 0	II.*Oc. R.
	21 31 48	I.*Sh. I.
	22 40 14	I. Tr. I.
	23 40 57	I. Sh. E.
6	0 48 40	I. Tr. E.
	18 39 13	I.*Ec. D.
	21 58 44	I.*Oc. R.
7	8 57 48	II. Sh. I.
	11 17 4	II. Tr. I.
	11 27 26	II. Sh. E.
	13 43 7	II. Tr. E.
	16 0 11	I.*Sh. I.
	17 7 16	I.*Tr. I.
	18 9 22	I.*Sh. E.
	19 15 44	I.*Tr. E.
8	13 7 48	I. Ec. D.
	15 13 12	III.*Sh. I.
	16 25 54	I.*Oc. R.
	17 7 8	III.*Sh. E.
	19 49 37	III.*Tr. I.
	21 33 2	III.*Tr. E.
9	4 0 8	II. Ec. D.
	8 40 32	II. Oc. R.
	10 28 35	I. Sh. I.
9	11 34 15	I. Tr. I.
	12 37 49	I. Sh. E.
	13 42 44	I. Tr. E.
10	7 36 17	I. Ec. D.
	10 52 53	I. Oc. R.
	22 15 36	II.*Sh. I.
11	0 28 58	II. Tr. I.
	0 45 22	II. Sh. E.
	2 55 2	II. Tr. E.
	4 56 57	I. Sh. I.
	6 1 8	I. Tr. I.
	7 6 14	I. Sh. E.
	8 9 38	I. Tr. E.
12	2 4 52	I. Ec. D.
	4 59 57	III. Ec. D.
	5 19 54	I. Oc. R.
	6 56 30	III. Ec. R.
	9 24 19	III. Oc. D.
	11 9 40	III. Oc. R.
	17 17 30	II.*Ec. D.
	21 51 32	II.*Oc. R.
	23 25 24	I. Sh. I.
13	0 28 0	I. Tr. I.
	1 34 43	I. Sh. E.
	2 36 31	I. Tr. E.
	20 33 20	I.*Ec. D.
	23 46 43	I. Oc. R.
14	11 34 5	II. Sh. I.
	13 41 2	II.*Tr. I.
	14 4 2	II.*Sh. E.
	16 7 9	II.*Tr. E.
	17 53 47	I.*Sh. I.
	18 54 45	I.*Tr. I.
	20 3 9	I.*Sh. E.
	21 3 18	I.*Tr. E.
15	15 1 56	I.*Ec. D.
	18 13 37	I.*Oc. R.
	19 12 18	III.*Sh. I.
	21 7 27	III.*Sh. E.
	23 23 9	III. Tr. I.
16	1 5 55	III. Tr. E.
	6 34 49	II. Ec. D.
	11 1 54	II. Oc. R.
	12 22 11	I. Sh. I.
	13 21 27	I. Tr. I.
	14 31 36	I.*Sh. E.
	15 30 2	I.*Tr. E.
17	9 30 27	I. Ec. D.
	12 40 20	I. Oc. R.
18	0 51 58	II. Sh. I.
	2 51 47	II. Tr. I.
	3 22 4	II. Sh. E.
18	5 17 58	II. Tr. E.
	6 50 34	I. Sh. I.
	7 48 3	I. Tr. I.
	9 0 2	I. Sh. E.
	9 56 40	I. Tr. E.
19	3 59 3	I. Ec. D.
	7 7 4	I. Oc. R.
	8 59 10	III. Ec. D.
	10 56 49	III. Ec. R.
	12 55 24	III. Oc. D.
	14 40 9	III.*Oc. R.
	19 52 10	II.*Ec. D.
20	0 11 45	II. Oc. R.
	1 19 1	I. Sh. I.
	2 14 39	I. Tr. I.
	3 28 31	I. Sh. E.
	4 23 17	I. Tr. E.
	22 27 32	I.*Ec. D.
21	1 33 38	I. Oc. R.
	14 10 36	II.*Sh. I.
	16 2 47	II.*Tr. I.
	16 40 53	II.*Sh. E.
	18 29 3	II.*Tr. E.
	19 47 25	I.*Sh. I.
	20 41 9	I.*Tr. I.
	21 56 58	I.*Sh. E.
	22 49 48	I.*Tr. E.
22	16 56 10	I.*Ec. D.
	20 0 16	I.*Oc. R.
	23 12 5	III. Sh. I.
23	1 8 30	III. Sh. E.
	2 52 38	III. Tr. I.
	4 34 54	III. Tr. E.
	9 9 27	II. Ec. D.
	13 21 1	II.*Oc. R.
	14 15 49	I.*Sh. I.
	15 7 35	I.*Tr. I.
	16 25 26	I.*Sh. E.
	17 16 16	I.*Tr. E.
24	11 24 43	I. Ec. D.
	14 26 44	I.*Oc. R.
25	3 28 32	II. Sh. I.
	5 12 26	II. Tr. I.
	5 58 58	II. Sh. E.
	7 38 47	II. Tr. E.
	8 44 13	I. Sh. I.
	9 33 56	I. Tr. I.
	10 53 53	I. Sh. E.
	11 42 40	I. Tr. E.
26	5 53 20	I. Ec. D.
	8 53 14	I. Oc. R.
	12 58 26	III.*Ec. D.
	14 57 11	III.*Ec. R.
26	16 22 2	III.*O
	18 6 12	III.*O
	22 26 48	II.*E
27	2 29 51	II. O
	3 12 41	I. S
	4 0 17	I. T
	5 22 23	I. S
	6 9 2	I. T
28	0 21 51	I. E
	3 19 34	I. O
	16 47 18	II.*S
	18 22 26	II.*
	19 17 54	II.*S
	20 48 55	II.*
	21 41 6	I.*S
	22 26 33	I.*
	23 50 51	I. S
29	0 35 20	I. T
	18 50 31	I.*E
	21 45 58	I.*O
30	3 11 30	III. S
	5 9 12	III. S
	6 17 17	III. T
	7 59 18	III. T
	11 44 6	II. E
	15 38 10	II.*O
	16 9 32	I.*S
	16 52 45	I.*
	18 19 20	I.*S
	19 1 34	I.*
31	13 19 5	I.*
	16 12 13	I.*

NOTE.—I. denotes ingress; E., egress; D., disappearance; R., reappearance; Ec., eclipse; Oc., occ Tr., transit of the satellite; Sh., transit of the shadow. * Visible at Washington.

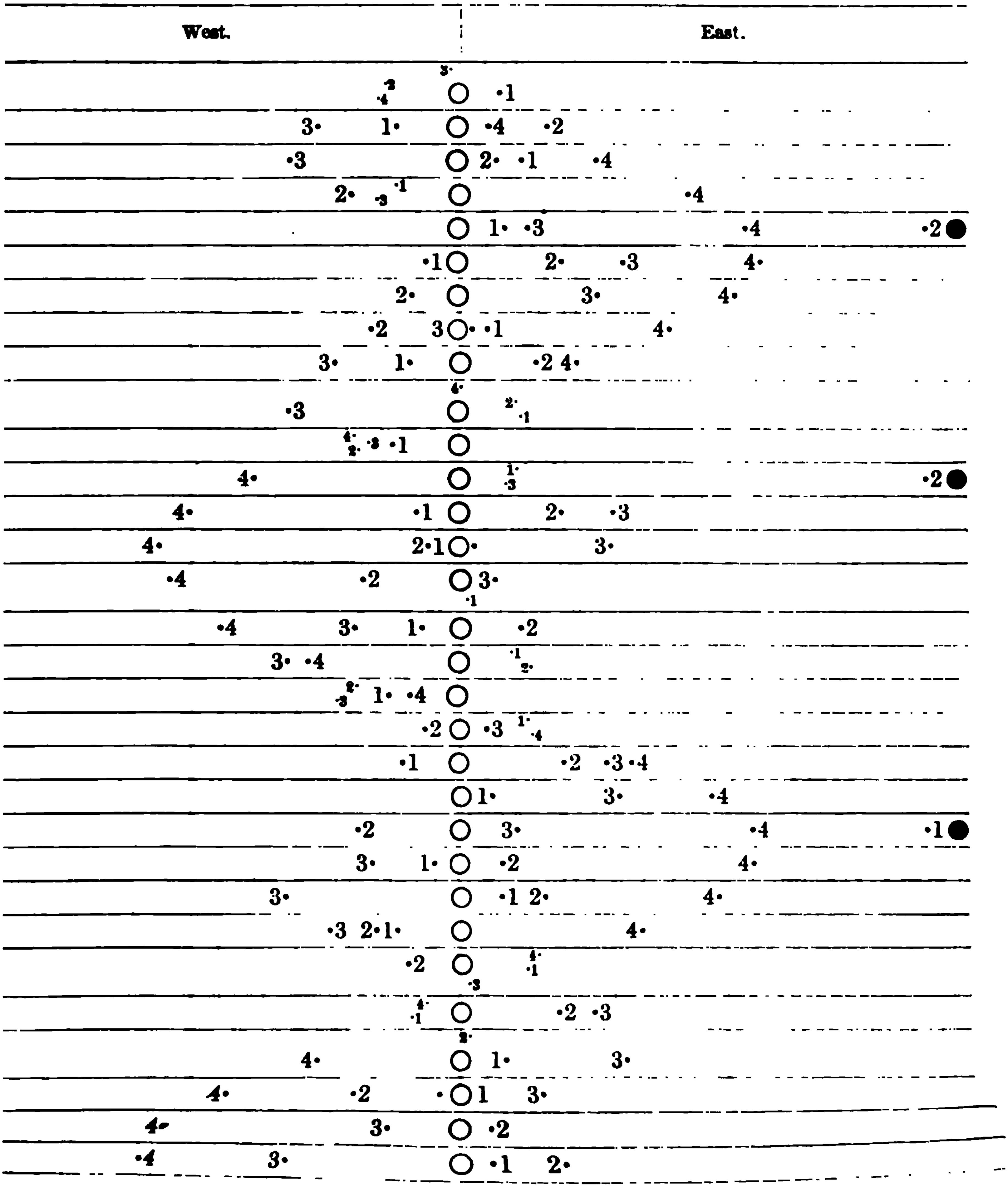
GREENWICH MEAN TIME.

OCTOBER.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



Configurations at 18h 15m for an Inverting Telescope.



GREENWICH MEAN TIME.

NOVEMBER.

d h m s	
1 6 5 19	II. Sh. I.
7 31 8	II. Tr. I.
8 36 4	II. Sh. E.
9 57 44	II. Tr. E.
10 37 57	I. Sh. I.
11 18 54	I. Tr. I.
12 47 48	I.*Sh. E.
13 27 45	I.*Tr. E.
2 7 47 45	I. Ec. D.
10 38 31	I. Oc. R.
16 58 7	III.*Ec. D.
18 58 0	III.*Ec. R.
19 44 56	III.*Oc. D.
21 28 51	III.*Oc. R.
3 1 1 26	II. Ec. D.
4 46 6	II. Oc. R.
5 6 26	I. Sh. I.
5 45 2	I. Tr. I.
7 16 19	I. Sh. E.
7 53 54	I. Tr. E.
4 2 16 18	I. Ec. D.
5 4 39	I. Oc. R.
19 24 14	II.*Sh. I.
20 40 17	II.*Tr. I.
21 55 8	II.*Sh. E.
23 7 2	II.*Tr. E.
23 34 53	I. Sh. I.
5 0 11 6	I. Tr. I.
1 44 49	I. Sh. E.
2 20 1	I. Tr. E.
20 44 59	I.*Ec. D.
23 30 52	I. Oc. R.
6 7 11 18	III. Sh. I.
9 10 20	III. Sh. E.
9 38 22	III. Tr. I.
11 20 28	III. Tr. E.
14 18 44	II.*Ec. D.
17 53 36	II.*Oc. R.
18 3 21	I.*Sh. I.
18 37 6	I.*Tr. I.
20 13 19	I.*Sh. E.
20 46 3	I.*Tr. E.
7 15 13 35	I.*Ec. D.
17 56 56	I.*Oc. R.
8 8 42 22	II. Sh. I.
9 48 11	II. Tr. I.
11 13 24	II. Sh. E.
12 15 5	II.*Tr. E.
12 31 48	I.*Sh. I.
13 3 4	I.*Tr. I.
14 41 48	I.*Sh. E.
15 12 2	I.*Tr. E.
9 9 42 17	I. Ec. D.
12 23 4	I.*Oc. R.

d h m s	
9 20 58 7	III.*Ec. D.
22 59 7	III.*Ec. R.
23 4 27	III.*Oc. D.
10 0 48 28	III. Oc. R.
3 36 3	II. Ec. D.
7 0 18	I. Sh. I.
7 0 48	II. Oc. R.
7 29 2	I. Tr. I.
9 10 21	I. Sh. E.
9 38 2	I. Tr. E.
11 4 10 52	I. Ec. D.
6 49 2	I. Oc. R.
22 1 24	II.*Sh. I.
22 56 38	II.*Tr. I.
12 0 32 34	II. Sh. E.
1 23 42	II. Tr. E.
1 28 47	I. Sh. I.
1 54 57	I. Tr. I.
3 38 52	I. Sh. E.
4 3 59	I. Tr. E.
22 39 35	I.*Ec. D.
13 1 15 7	I. Oc. R.
11 10 44	III. Sh. I.
12 55 49	III.*Tr. I.
13 11 3	III.*Sh. E.
14 38 21	III.*Tr. E.
16 53 24	II.*Ec. D.
19 57 17	I.*Sh. I.
20 7 41	II.*Oc. R.
20 20 49	I.*Tr. I.
22 7 24	I.*Sh. E.
22 29 53	I.*Tr. E.
14 17 8 13	I.*Ec. D.
19 41 3	I.*Oc. R.
15 11 19 38	II.*Sh. I.
12 3 54	II.*Tr. I.
13 50 55	II.*Sh. E.
14 25 46	I.*Sh. I.
14 31 9	II.*Tr. E.
14 46 39	I.*Tr. I.
16 35 54	I.*Sh. E.
16 55 44	I.*Tr. E.
16 11 36 57	I.*Ec. D.
14 7 4	I.*Oc. R.
17 0 58 54	III. Ec. D.
4 6 25	III. Oc. R.
6 10 46	II. Ec. D.
8 54 18	I. Sh. I.
9 12 30	I. Tr. I.
9 14 24	II. Oc. R.
11 4 29	I. Sh. E.
11 21 37	I.*Tr. E.
18 6 5 34	I. Ec. D.

d h m s	
18 8 32 57	I. Oc. R.
19 0 38 48	II. Sh. I.
1 11 52	II. Tr. I.
3 10 11	II. Sh. E.
3 22 49	I. Sh. I.
3 38 19	I. Tr. I.
3 39 19	II. Tr. E.
5 33 2	I. Sh. E.
5 47 27	I. Tr. E.
20 0 34 19	I. Ec. D.
2 58 56	I. Oc. R.
15 10 9	III.*Sh. I.
16 10 51	III.*Tr. I.
17 11 44	III.*Sh. E.
17 54 12	III.*Tr. E.
19 28 6	II.*Ec. D.
21 51 21	I.*Sh. I.
22 4 6	I.*Tr. I.
22 20 53	II.*Oc. R.
21 0 1 36	I. Sh. E.
0 13 16	I. Tr. E.
19 2 59	I.*Ec. D.
21 24 49	I.*Oc. R.
22 13 57 9	II.*Sh. I.
14 18 49	II.*Tr. I.
16 19 52	I.*Sh. I.
16 28 39	II.*Sh. E.
16 29 52	I.*Tr. I.
16 46 27	II.*Tr. E.
18 30 8	I.*Sh. E.
18 39 4	I.*Tr. E.
23 13 31 45	I.*Ec. D.
15 50 47	I.*Oc. R.
24 4 59 9	III. Ec. D.
7 22 24	III. Oc. R.
8 45 30	II. Ec. D.
10 48 27	I.*Sh. I.
10 55 40	I.*Tr. I.
11 27 18	II.*Oc. R.
12 58 44	I.*Sh. E.
13 4 53	I.*Tr. E.
25 8 0 24	I. Ec. D.
10 16 38	I. Oc. R.
26 3 16 29	II. Sh. I.
3 26 34	II. Tr. I.
5 17 1	I. Sh. I.
5 21 28	I. Tr. I.
5 48 2	II. Sh. E.
5 54 26	II. Tr. E.
7 27 19	I. Sh. E.
7 30 41	I. Tr. E.
27 2 29 12	I. Ec. D.
4 42 37	I. Oc. R.

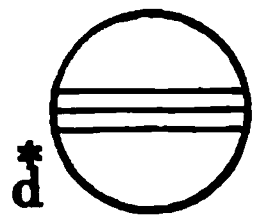
d h m s	
27 19 9 48	III.*S
19 24 42	III.*T
21 9 17	III.*T
21 12 36	III.*S
22 2 53	II.*T
23 45 34	I. S
23 47 14	I. T
28 0 33 41	II. O
1 55 54	I. S
1 56 29	I. T
20 57 53	I.*E
23 9 18	I.*O
29 16 33 24	II.*
16 34 54	II.*S
18 13 0	I.*
18 14 8	I.*T
19 1 27	II.*
19 6 32	II.*T
20 22 17	I.*
20 24 29	I.*T
30 15 24 4	I.*
17 38 8	I.*

NOTE.—I. denotes ingress; E., egress; D., disappearance; R., reappearance; Ec., eclipse; Oc., o
Tr., transit of the satellite; Sh., transit of the shadow. *Visible at Washington.

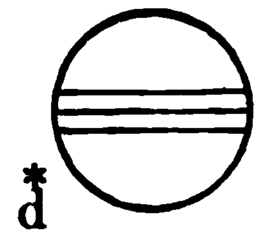
GREENWICH MEAN TIME.

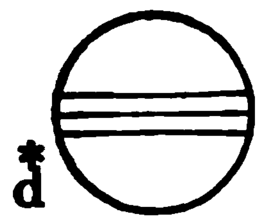
NOVEMBER.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

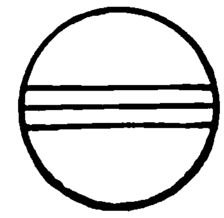


III.

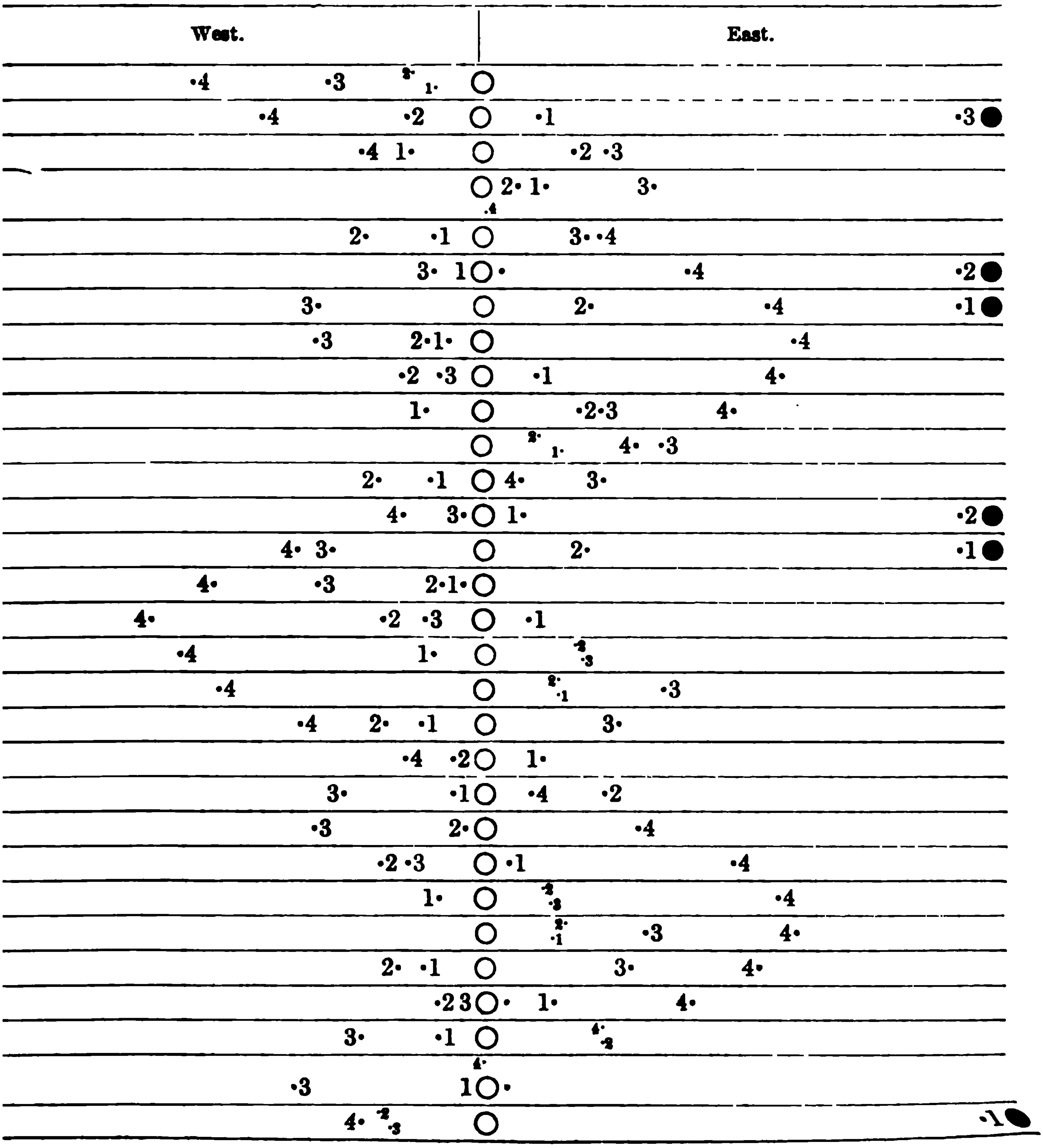




IV. No Eclipse.



Configurations at 17h 15m for an Inverting Telescope.



MEAN TIME.

DECEMBER.

d	h m s	
1	8 51 10	III. Oc. D.
	11 4 9	III.*Ec. R.
	11 13 14	II.*Oc. D.
	12 38 49	I.*Tr. I.
	12 42 45	I.*Sh. I.
	13 50 26	II.*Ec. R.
	14 48 7	I.*Tr. E.
	14 53 5	I.*Sh. E.
2	9 40 55	I. Oc. D.
	12 6 50	I.*Ec. R.
3	5 41 13	II. Tr. I.
	5 54 21	II. Sh. I.
	7 4 39	I. Tr. I.
	7 11 21	I. Sh. I.
	8 9 30	II. Tr. E.
	8 26 0	II. Sh. E.
	9 13 57	I Tr. E.
	9 21 42	I. Sh. E.
4	4 15 50	I. Oc. D.
	6 35 41	I. Ec. R.
	22 38 21	III.*Tr. I.
	23 9 33	III.*Sh. I.
5	0 19 30	II Oc. D.
	0 24 36	III. Tr. E.
	1 13 32	III. Sh. E.
	1 30 28	I Tr. I.
	1 39 56	I. Sh. I
	3 7 54	II. Ec. R.
	3 39 48	I. Tr E.
	3 50 18	I. Sh. E
	22 41 49	I *Oc. D.
6	1 4 25	I. Ec. R.
	18 48 14	II.*Tr. I.
	19 12 51	II *Sh. I.
	19 56 19	I *Tr. I.
	20 8 32	I.*Sh. I.
	21 16 41	II.*Tr. E.
	21 44 33	II.*Sh E
	22 5 40	I.*Tr E.
	22 18 54	I.*Sh. E.
7	17 7 53	I.*Oc. D.
	19 33 16	I *Ec. R.
8	12 5 17	III *Oc. D.
	13 25 57	II.*Oc. D.
	14 22 14	I *Tr I.
	14 47 10	I *Sh. I.
	15 5 19	III.*Ec. R.
	16 25 25	II *Ec. R.
	16 31 34	I *Tr. E.
	16 47 32	I.*Sh. E.
9	11 33 49	I *Oc D.
	14 2 1	I.*Ec R.
10	7 56 25	II. Tr. I.

d	h m s	
10	8 32 24	II. Sh. I.
	8 48 10	I. Tr. I.
	9 5 48	I. Sh. I.
	10 25 9	II.*Tr. E.
	10 57 32	I.*Tr. E.
	11 4 6	II.*Sh. E.
	11 16 10	I.*Sh. E.
11	5 59 55	I. Oc. D.
	8 30 53	I. Ec. R.
12	1 53 35	III. Tr. I.
	2 32 35	II. Oc. D.
	3 10 5	III. Sh. I.
	3 14 7	I. Tr. I.
	3 34 26	I. Sh. I.
	3 41 53	III. Tr. E.
	5 15 14	III. Sh. E.
	5 23 29	I. Tr. E.
	5 42 57	II. Ec. R.
	5 44 47	I. Sh. E.
13	0 25 58	I. Oc. D.
	2 59 40	I. Ec. R.
	21 3 53	II.*Tr. I.
	21 40 6	I.*Tr. I.
	21 50 57	II.*Sh. I.
	22 3 4	I.*Sh. I.
	23 32 51	II. Tr. E.
	23 49 29	I. Tr. E.
14	0 13 24	I. Sh. E.
	0 22 41	II Sh E.
	18 52 9	I.*Oc. D.
	21 28 33	I.*Ec. R.
15	15 20 51	III *Oc. D.
	15 39 31	II *Oc. D.
	16 6 10	I.*Tr. I.
	16 31 43	I.*Sh. I.
	18 15 33	I *Tr. E
	18 42 3	I.*Sh. E.
	19 0 32	II.*Ec R.
	19 6 35	III.*Ec. R.
16	13 18 15	I *Oc. D.
	15 57 19	I.*Ec. R.
17	10 12 39	II. Tr. I.
	10 32 17	I *Tr. I.
	11 0 23	I.*Sh. I.
	11 10 34	II *Sh. I.
	12 41 40	I *Tr. E
	12 41 51	II.*Tr. E.
	13 10 42	I.*Sh. E.
	13 42 15	II.*Sh. E.
18	7 44 31	I Oc. D.
	10 26 13	I *Ec. R.
19	4 46 46	II. Oc. D.
	4 58 24	I. Tr. I.

d	h m s	
19	5 10 24	III. Tr. I.
	5 29 2	I. Sh. I.
	7 1 6	III. Tr. E.
	7 7 49	I. Tr. E.
	7 10 15	III. Sh. I.
	7 39 21	I. Sh. E.
	8 18 10	II. Ec. R.
	[illegible]	III. Sh. E.
20	2 10 44	I. Oc. D.
	4 55 1	I. Ec. R.
	23 20 50	II. Tr. I.
	23 24 35	I. Tr. I.
	23 57 42	I. Sh. I.
21	0 29 11	II. Sh. I.
	1 34 0	I. Tr. E.
	1 50 15	II. Tr. E.
	2 7 59	I. Sh. E.
	3 0 52	II. Sh. E.
	20 37 8	I.*Oc. D.
	23 23 57	I. Ec. R.
22	17 50 52	I.*Tr. I.
	17 54 24	II.*Oc. D.
	[illegible]	I.*Sh. I.
	18 39 15	III.*Oc. D.
	20 0 16	I.*Tr. E.
	20 32 59	III.*Oc. R.
	20 36 40	I.*Sh. E.
	21 0 3	III.*Ec. D
	21 35 48	II.*Ec. R
	23 8 18	III. Ec. R.
23	15 3 26	I.*Oc. D.
	17 52 44	I.*Ec. R.
24	12 17 12	I.*Tr. I.
	12 30 26	II.*Tr. I
	12 55 5	I.*Sh I.
	13 48 52	II.*Sh. I.
	14 26 36	I.*Tr. E.
	15 0 4	II.*Tr. E.
	15 5 20	I.*Sh. E.
	16 20 29	II.*Sh. E.
25	9 29 55	I. Oc. D.
	12 21 40	I.*Ec. R.
26	6 43 34	I. Tr. I.
	7 2 28	II. Oc. D.
	7 23 45	I. Sh. I.
	8 30 37	III. Tr. I.
	8 52 59	I. Tr. E.
	9 34 0	I. Sh. E.
	10 23 52	III.*Tr. E.
	10 53 29	II *Ec. R.
	11 10 49	III.*Sh. I.
	13 18 14	III.*Sh E.
27	3 56 23	I. Oc. D.
	6 50 29	I. Ec. R.

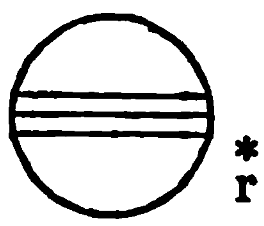
d	h m s	
28	1 9 59	I.
	1 39 34	II.
	1 52 27	I.
	3 7 33	II.
	3 19 24	I.
	4 2 40	I.
	4 9 25	II.
	5 39 10	II.
	22 23 1	I.
29	1 19 26	I.
	19 36 31	I.
	20 11 1	II.
	20 21 10	I.
	21 45 56	I.
	22 1 16	III.
	22 31 22	I.
	23 57 41	III.
30	0 11 11	II.
	1 0 48	III.
	3 10 21	III.
	16 49 35	I.
	19 48 16	I
31	14 3 7	I
	14 49 53	I
	14 50 9	II
	16 12 31	I
	16 27 15	II
	17 0 4	I
	17 20 13	II
	18 58 46	II

NOTE.—I. denotes ingress; E., egress; D., disappearance; R., reappearance; Ec., eclipse; Oc., Tr., transit of the satellite; Sh., transit of the shadow. *Visible at Washington.

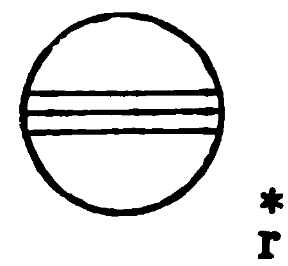
GREENWICH MEAN TIME.

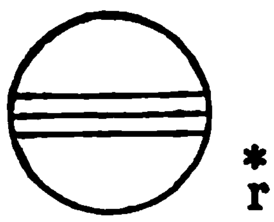
DECEMBER.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

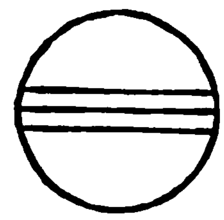


III.



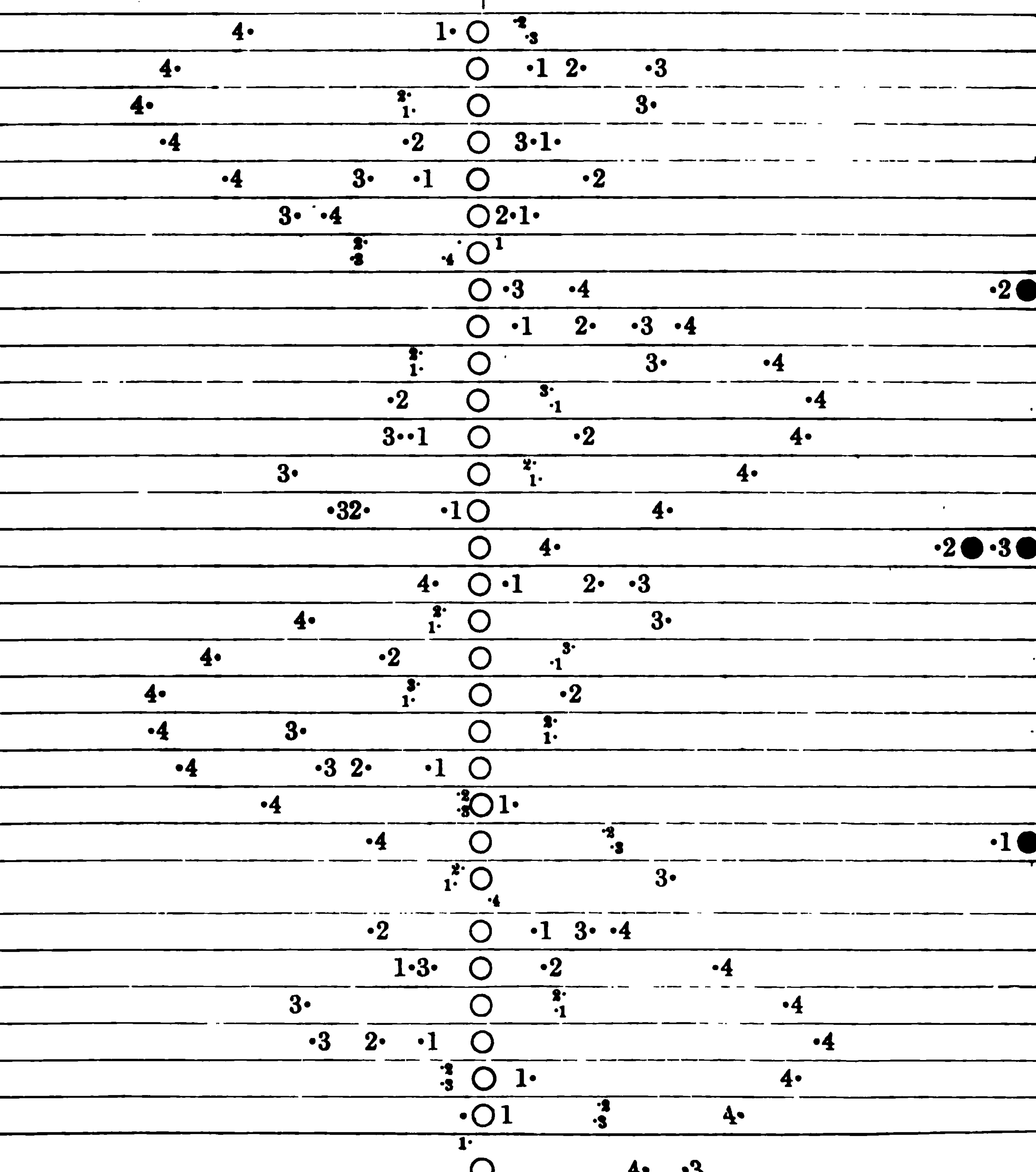


IV. No Eclipse.



Configurations at 16^h 15^m for an Inverting Telescope.

West. East.

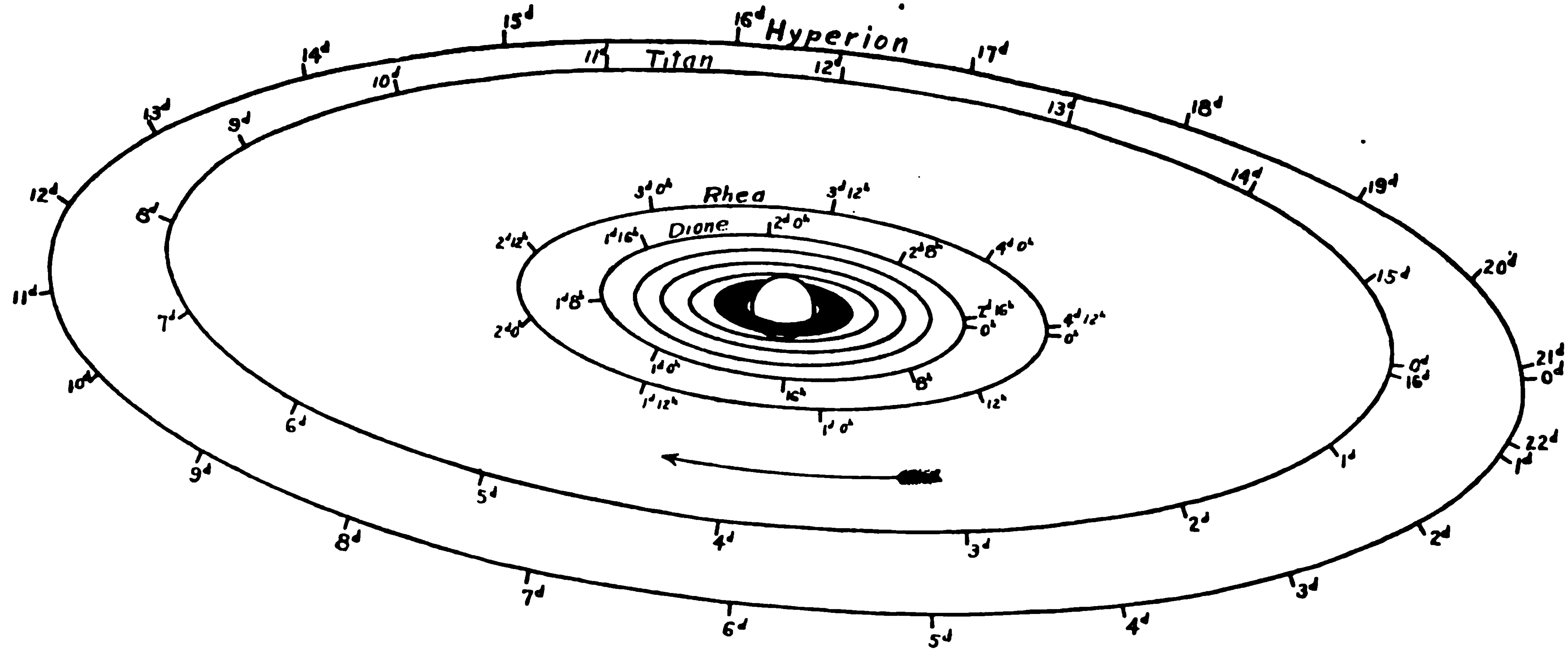


ELEMENTS FOR [illegible], APPEAR
AND MAGNITUDE OF SATURN'S RINGS.

The factor to be multiplied by a and b to obtain the axes of—

The inner ellipse of the outer ring=0.8801, log factor=9.9445
The outer ellipse of the inner ring=0.8599, log [illegible]
The inner ellipse of the inner ring=0.6650, [illegible]
The inner ellipse of the dusky ring=0.5486, [illegible]

Note.—The negative sign of B indicates that the visible surface of



North

NAMES OF THE SATELLITES.	
I.	Mimas.
II.	Enceladus.
III.	Tethys.
IV.	Dione.
V.	Rhea.
VI.	Titan.
VII.	Hyperion.
VIII.	Iapetus.
IX.	Phœbe.

APPARENT ORBITS OF THE SEVEN INNER SATELLITES OF SATURN,

AT DATE OF OPPOSITION, JANUARY 17, 1917,

AS SEEN IN AN INVERTING TELESCOPE.

MEAN SYNODIC PERIODS.	d	h
I.	0	22.6
II.	1	8.9
III.	1	21.3
IV.	2	17.7
V.	4	12.5
VI.	15	23.3
VII.	21	7.6
VIII.	79	22.1
IX.	523	15.6

GREENWICH MEAN TIME.

In the diagram on the preceding page, the points of the orbits marked "0" are th eastern elongation, as seen in an inverting telescope. The times of these elongation found from the following tables, and the apparent position of a satellite at any other t be marked on the diagram by setting off on the proper orbit the elapsed interval in hours since the last eastern elongation. The orbits of the five inner satellites are re circular, and the time of any greatest elongation not given in the tables may be read from those given by adding or subtracting the proper multiple of the mean synodic per Titan, Hyperion, and Iapetus the eccentricity is taken into account, and for Iapetus both of the greatest elongations and of the conjunctions are given. The following abb are used in the tables:

E., Eastern Elongation. I., Inferior Conjunction (north of planet).
W., Western Elongation. S., Superior Conjunction (south of planet).

MIMAS.

Greatest Elongations Visible in the United States.

	d h		d h		d h		d h		d h	
Jan.	1 19.0 E.	Jan.	29 14.0 W.	Feb.	25 21.9 W.	Apr.	3 16.0 W.	Oct.	12 23.4 W.	Nov.
	2 17.6 E.		30 1.4 E.		26 20.5 W.		4 14.6 W.		13 22.0 W.	
	3 16.2 E.		30 12.7 W.		27 19.1 W.		5 13.3 W.		14 20.6 W.	
	4 14.8 E.		31 0.0 E.		28 17.7 W.		8 20.4 E.		15 19.3 W.	Dec.
	5 2.1 W.		31 11.3 W.	Mar.	1 16.4 W.		9 19.0 E.		20 1.1 E.	
	5 13.4 E.		31 22.6 E.		2 15.0 W.		10 17.7 E.		20 23.7 E.	
	6 0.8 W.	Feb.	1 21.2 E.		3 13.6 W.		11 16.3 E.		21 22.3 E.	
	6 12.1 E.		2 19.8 E.		4 12.2 W.		12 14.9 E.		22 20.9 E.	
	6 23.4 W.		3 18.4 E.		5 22.2 E.		13 13.5 E.		23 19.5 E.	
	7 22.0 W.		4 17.0 E.		6 20.8 E.		17 19.3 W.		24 18.1 E.	
	8 20.6 W.		5 15.6 E.		7 19.4 E.		18 18.0 W.		28 1.3 W.	
	9 19.2 W.		6 14.2 E.		8 18.0 E.		19 16.6 W.		28 23.9 W.	
	10 17.8 W.		7 12.9 E.		9 16.7 E.		20 15.2 W.		29 22.5 W.	
	11 16.4 W.		8 0.2 W.		10 15.3 E.		21 13.8 W.		30 21.2 W.	
	12 15.0 W.		8 11.5 E.		11 13.9 E.		25 19.6 E.		31 19.8 W.	
	13 13.6 W.		8 22.8 W.		12 12.5 E.		26 18.3 E.	Nov.	1 18.4 W.	
	14 1.0 E.		9 21.4 W.		13 22.4 W.		27 16.9 E.		6 0.2 E.	
	14 12.3 W.		10 20.0 W.		14 21.0 W.		28 15.5 E.		6 22.8 E.	
	14 23.6 E.		11 18.6 W.		15 19.7 W.		29 14.1 E.		7 21.4 E.	
	15 22.2 E.		12 17.2 W.		16 18.3 W.	May	4 18.6 W.		8 20.0 E.	
	16 20.8 E.		13 15.8 W.		17 16.9 W.		5 17.2 W.		9 18.6 E.	
	17 19.4 E.		14 14.4 W.		18 15.5 W.		6 15.8 W.		10 17.3 E.	
	18 18.0 E.		15 13.1 W.		19 14.1 W.		7 14.4 W.		13 1.8 W.	
	19 16.6 E.		16 0.4 E.		20 12.8 W.		8 13.1 W.		14 0.4 W.	
	20 15.2 E.		16 11.7 W.		22 21.3 E.		13 17.5 E.		14 23.0 W.	
	21 13.8 E.		16 23.0 E.		23 19.9 E.		14 16.1 E.		15 21.7 W.	
	22 1.2 W.		17 21.6 E.		24 18.5 E.		15 14.7 E.		16 20.3 W.	
	22 12.5 E.		18 20.2 E.		25 17.2 E.		16 13.4 E.		17 18.9 W.	
	22 23.8 W.		19 18.8 E.		26 15.8 E.		. . . .		18 17.5 W.	
	23 22.4 W.		20 17.4 E.		27 14.4 E.		. . . .		22 0.7 E.	
	24 21.0 W.		21 16.1 E.		28 13.0 E.	Oct.	4 0.5 E.		22 23.3 E.	
	25 19.6 W.		22 14.7 E.		30 21.5 W.		4 23.1 E.		23 21.9 E.	
	26 18.2 W.		23 13.3 E.		31 20.2 W.		5 21.7 E.		24 20.5 E.	
	27 16.8 W.		24 11.9 E.	Apr.	1 18.8 W.		6 20.3 E.		25 19.1 E.	
	28 15.4 W.		24 23.3 W.		2 17.4 W.		12 0.8 W.		26 17.8 E.	

GREENWICH MEAN TIME.

ENCELADUS.

		d h		d h		d h		d h		d h
E.	Feb.	11 1.5 E.	Mar.	22 19.0 E.	May	1 13.0 E.	Oct.	18 12.4 E.	Nov.	27 6.1 E.
E.		12 10.4 E.		24 3.9 E.		2 21.8 E.		19 21.3 E.		28 15.0 E.
E.		13 19.3 E.		25 12.8 E.		4 6.7 E.		21 6.2 E.		29 23.9 E.
E.		15 4.1 E.		26 21.7 E.		5 15.6 E.		22 15.1 E.	Dec.	1 8.7 E.
E.		16 13.0 E.		28 6.6 E.		7 0.5 E.		24 0.0 E.		2 17.6 E.
E.		17 21.8 E.		29 15.5 E.		8 9.4 E.		25 8.9 E.		4 2.5 E.
E.		19 6.7 E.		31 0.4 E.		9 18.3 E.		26 17.7 E.		5 11.4 E.
E.		20 15.6 E.	Apr.	1 9.2 E.		11 3.2 E.		28 2.6 E.		6 20.3 E.
E.		22 0.5 E.		2 18.1 E.		12 12.1 E.		29 11.5 E.		8 5.2 E.
E.		23 9.4 E.		4 3.0 E.		13 21.0 E.		30 20.4 E.		9 14.0 E.
E.		24 18.2 E.		5 11.9 E.		15 5.9 E.	Nov.	1 5.3 E.		10 22.9 E.
E.		26 3.1 E.		6 20.8 E.		16 14.8 E.		2 14.2 E.		12 7.8 E.
E.		27 12.0 E.		8 5.7 E.		17 23.7 E.		3 23.1 E.		13 16.7 E.
E.		28 20.9 E.		9 14.6 E.		19 8.5 E.		5 8.0 E.		15 1.6 E.
E.	Mar.	2 5.8 E.		10 23.5 E.		. . . .		6 16.8 E.		16 10.5 E.
2 E.		3 14.7 E.		12 8.4 E.		. . . .		8 1.7 E.		17 19.3 E.
1 E.		4 23.5 E.		13 17.3 E.	Sept.	30 16.7 E.		9 10.6 E.		19 4.2 E.
0 E.		6 8.4 E.		15 2.2 E.	Oct.	2 1.6 E.		10 19.5 E.		20 13.1 E.
9 E.		7 17.3 E.		16 11.1 E.		3 10.5 E.		12 4.4 E.		21 22.0 E.
8 E.		9 2.2 E.		17 20.0 E.		4 19.4 E.		13 13.3 E.		23 6.8 E.
7 E.		10 11.1 E.		19 4.9 E.		6 4.3 E.		14 22.1 E.		24 15.7 E.
6 E.		11 19.9 E.		20 13.8 E.		7 13.2 E.		16 7.0 E.		26 0.6 E.
5 E.		13 4.8 E.		21 22.7 E.		8 22.1 E.		17 15.9 E.		27 9.4 E.
4 E.		14 13.7 E.		23 7.6 E.		10 7.0 E.		19 0.8 E.		28 18.3 E.
3 E.		15 22.6 E.		24 16.5 E.		11 15.9 E.		20 9.7 E.		30 3.1 E.
.1 E.		17 7.5 E.		26 1.4 E.		13 0.8 E.		21 18.6 E.		31 12.0 E.
.0 E.		18 16.4 E.		27 10.3 E.		14 9.7 E.		23 3.4 E.		
.8 E.		20 1.2 E.		28 19.2 E.		15 18.6 E.		24 12.3 E.		
.7 E.		21 10.1 E.		30 4.1 E.		17 3.5 E.		25 21.2 E.		

TETHYS.

h		d h		d h		d h		d h		d h
.2 E.	Feb.	9 19.3 E.	Mar.	21 10.6 E.	Apr.	30 2.3 E.	Oct.	15 4.9 E.	Nov.	23 20.4 E.
.5 E.		11 16.6 E.		23 7.9 E.	May	1 23.6 E.		17 2.2 E.		25 17.7 E.
.8 E.		13 13.8 E.		25 5.2 E.		3 20.9 E.		18 23.5 E.		27 15.1 E.
.1 E.		15 11.1 E.		27 2.5 E.		5 18.2 E.		20 20.8 E.		29 12.4 E.
.4 E.		17 8.4 E.		28 23.8 E.		7 15.6 E.		22 18.2 E.	Dec.	1 9.7 E.
.7 E.		19 5.7 E.		30 21.1 E.		9 12.9 E.		24 15.5 E.		3 7.0 E.
.9 E.		21 3.0 E.	Apr.	1 18.4 E.		11 10.2 E.		26 12.8 E.		5 4.3 E.
.2 E.		23 0.3 E.		3 15.7 E.		13 7.5 E.		28 10.1 E.		7 1.6 E.
.5 E.		24 21.6 E.		5 13.0 E.		15 4.9 E.		30 7.5 E.		8 22.9 E.
.8 E.		26 18.9 E.		7 10.3 E.		17 2.2 E.	Nov.	1 4.8 E.		10 20.2 E.
.1 E.		28 16.2 E.		9 7.6 E.		18 23.5 E.		3 2.1 E.		12 17.5 E.
.4 E.	Mar.	2 13.5 E.		11 4.9 E.		. . . .		4 23.4 E.		14 14.8 E.
.7 E.		4 10.8 E.		13 2.3 E.		. . . .		6 20.7 E.		16 12.1 E.
.0 E.		6 8.1 E.		14 23.6 E.	Sept.	30 2.3 E.		8 18.0 E.		18 9.4 E.
.2 E.		8 5.4 E.		16 21.0 E.	Oct.	1 23.6 E.		10 15.3 E.		20 6.7 E.
.5 E.		10 2.7 E.		18 18.3 E.		3 20.9 E.		12 12.6 E.		22 4.0 E.
.8 E.		12 0.0 E.		20 15.6 E.		5 18.3 E.		14 9.9 E.		24 1.3 E.
.1 E.		13 21.3 E.		22 13.0 E.		7 15.6 E.		16 7.2 E.		25 22.6 E.
.4 E.		15 18.7 E.		24 10.3 E.		9 12.9 E.		18 4.5 E.		27 19.9 E.
.7 E.		17 16.0 E.		26 7.6 E.		11 10.2 E.		20 1.8 E.		29 17.1 E.
.0 E.		19 13.3 E.		28 4.9 E.		13 7.6 E.		21 23.1 E.		31 14.4 E.

GREENWICH MEAN TIME.

DIONE.

	d h		d h		d h		d h		d h		d
Jan.	1 6.4 E.	Feb.	11 7.0 E.	Mar.	24 8.1 E.	May	4 9.6 E.	Oct.	21 5.5 E.	Dec.	1
	4 0.0 E.		14 0.6 E.		27 1.8 E.		7 3.4 E.		23 23.2 E.		4
	6 17.6 E.		16 18.3 E.		29 19.5 E.		9 21.1 E.		26 16.9 E.		6
	9 11.3 E.		19 11.9 E.	Apr.	1 13.1 E.		12 14.8 E.		29 10.7 E.		9
	12 4.9 E.		22 5.6 E.		4 6.8 E.		15 8.5 E.	Nov.	1 4.4 E.		12
	14 22.5 E.		24 23.3 E.		7 0.5 E.		18 2.3 E.		3 22.1 E.		14
	17 16.2 E.		27 16.9 E.		9 18.2 E.		. . . .		6 15.8 E.		17
	20 9.8 E.	Mar.	2 10.6 E.		12 11.9 E.		. . . .		9 9.5 E.		20
	23 3.4 E.		5 4.3 E.		15 5.6 E.	Oct.	2 1.5 E.		12 3.1 E.		23
	25 21.1 E.		7 22.0 E.		17 23.3 E.		4 19.2 E.		14 20.8 E.		25
	28 14.7 E.		10 15.7 E.		20 17.1 E.		7 12.9 E.		17 14.5 E.		28
	31 8.4 E.		13 9.4 E.		23 10.8 E.		10 6.6 E.		20 8.2 E.		31
Feb.	3 2.0 E.		16 3.0 E.		26 4.5 E.		13 0.4 E.		23 1.9 E.		
	5 19.7 E.		18 20.7 E.		28 22.2 E.		15 18.1 E.		25 19.6 E.		
	8 13.3 E.		21 14.4 E.	May	1 15.9 E.		18 11.8 E.		28 13.2 E.		

RHEA.

	d h		d h		d h		d h		d h		d
Jan.	3 23.9 E.	Feb.	13 14.7 E.	Mar.	26 6.1 E.	May	5 22.5 E.	Oct.	15 19.0 E.	Nov.	25
	8 12.2 E.		18 3.1 E.		30 18.6 E.		10 11.0 E.		20 7.5 E.		29
	13 0.5 E.		22 15.4 E.	Apr.	4 7.0 E.		14 23.6 E.		24 20.0 E.	Dec.	4
	17 12.8 E.		27 3.8 E.		8 19.5 E.		19 12.1 E.		29 8.4 E.		9
	22 1.1 E.	Mar.	3 16.1 E.		13 8.0 E.		. . . .	Nov.	2 20.9 E.		13
	26 13.4 E.		8 4.5 E.		17 20.5 E.		. . . .		7 9.4 E.		18
	31 1.7 E.		12 16.9 E.		22 9.0 E.	Oct.	2 5.4 E.		11 21.8 E.		22
Feb.	4 14.1 E.		17 5.3 E.		26 21.5 E.		6 18.0 E.		16 10.3 E.		27
	9 2.4 E.		21 17.7 E.	May	1 10.0 E.		11 6.5 E.		20 22.7 E.		31

TITAN.

	d h		d h		d h		d h		d h		d
Jan.	7 5.7 E.	Feb.	15 16.3 W.	Mar.	27 18.6 E.	May	6 10.2 W.	Oct.	13 16.2 W.	Nov.	22
	14 21.6 W.		23 22.0 E.	Apr.	4 11.2 W.		14 17.2 E.		21 22.4 E.		30
	23 3.0 E.	Mar.	3 14.1 W.		12 17.7 E.		. . . .		29 15.9 W.	Dec.	8
	30 18.9 W.		11 20.1 E.		20 10.5 W.		. . . .	Nov.	6 21.8 E.		16
Feb.	8 0.4 E.		19 12.4 W.		28 17.2 E.	Oct.	5 22.5 E.		14 15.2 W.		24

HYPERION.

	d h		d h		d h		d h		d h		d
Jan.	5 12.4 E.	Feb.	16 15.7 E.	Mar.	30 22.3 E.	May	12 10.8 E.	Oct.	21 3.9 W.	Dec.	2
	17 1.5 W.		28 5.3 W.	Apr.	11 13.6 W.		. . . .		31 1.4 E.		12
	26 13.9 E.	Mar.	9 18.4 E.		21 3.9 E.		. . . .	Nov.	11 14.0 W.		24
Feb.	7 3.0 W.		21 8.7 W.	May	2 19.7 W.	Oct.	9 14.2 E.		21 11.6 E.		

IAPETUS.

	d h		d h		d h		d h		d h		d
Jan.	10 8.5 E.	Feb.	17 16.8 W.	Mar.	29 18.9 E.	May	8 3.7 W.	Oct.	17 10.2 W.	Nov.	27
	30 2.6 I.	Mar.	9 0.5 S.	Apr.	19 1.3 I.		. . . .	Nov.	6 11.4 S.	Dec.	17

DIFFERENTIAL COORDINATES OF PHOEBE.

FOR GREENWICH MEAN NOON.

e.	$\alpha_{Ph.}-\alpha_{Sat.}$	$\delta_{Ph.}-\delta_{Sat.}$	Date.	$\alpha_{Ph.}-\alpha_{Sat.}$	$\delta_{Ph.}-\delta_{Sat.}$	Date.	$\alpha_{Ph.}-\alpha_{Sat.}$	$\delta_{Ph.}-\delta_{Sat}$
	m s	′ ″		m s	′ ″		m s	′ ″
0	+2 9.7	−6 15	Apr. 14	+1 47.5	−1 30	Sept. 20	−1 48.4	+ 8 34
2	2 11.6	6 14	16	1 45.2	1 24	22	1 50.3	8 41
4	2 13.3	6 12	18	1 42.8	1 18	24	1 52.2	8 48
6	2 15.0	6 10	20	1 40.4	1 12	26	1 54.1	8 54
8	2 16.6	6 7	22	1 37.9	1 6	28	1 55.9	9 0
10	+2 18.1	−6 4	24	+1 35.4	−1 0	30	−1 57.6	+ 9 6
12	2 19.5	6 1	26	1 32.8	0 54	Oct. 2	1 59.3	9 12
14	2 20.8	5 58	28	1 30.2	0 48	4	2 1.0	9 18
16	2 22.0	5 54	30	1 27.6	0 42	6	2 2.6	9 23
18	2 23.0	5 50	May 2	1 25.0	0 36	8	2 4.2	9 28
20	+2 24.0	−5 46	4	+1 22.3	−0 29	10	−2 5.7	+ 9 33
22	2 24.9	5 41	6	1 19.6	0 23	12	2 7.2	9 38
24	2 25.7	5 36	8	1 16.8	0 17	14	2 8.6	9 42
26	2 26.4	5 31	10	1 14.0	0 11	16	2 9.9	9 46
28	2 27.0	5 26	12	1 11.2	−0 5	18	2 11.2	9 50
30	+2 27.6	−5 21	14	+1 8.4	+0 2	20	−2 12.5	+ 9 54
1	2 28.0	5 16	16	1 5.5	0 8	22	2 13.7	9 57
3	2 28.3	5 10	18	1 2.7	0 15	24	2 14.9	10 0
5	2 28.5	5 4	20	0 59.8	0 21	26	2 16.0	10 2
7	2 28.7	4 58	22	0 56.9	0 28	28	2 17.0	10 4
9	+2 28.7	−4 52	24	+0 53.9	+0 34	30	−2 18.0	+10 6
11	2 28.6	4 46	26	0 51.0	0 41	Nov. 1	2 19.0	10 8
13	2 28.5	4 40	28	0 48.0	0 48	3	2 19.8	10 9
15	2 28.2	4 33	30	0 45.1	0 54	5	2 20.6	10 10
17	2 27.9	4 27	June 1	0 42.1	1 1	7	2 21.4	10 11
19	+2 27.5	−4 21	3	+0 39.1	+1 8	9	−2 22.1	+10 11
21	2 27.0	4 14	5	0 36.1	1 15	11	2 22.8	10 11
23	2 26.4	4 8	7	0 33.0	1 23	13	2 23.4	10 11
25	2 25.7	4 1	9	0 30.0	1 30	15	2 23.9	10 10
27	2 25.0	3 55	11	0 27.0	1 37	17	2 24.4	10 9
1	+2 24.1	−3 48	13	+0 24.0	+1 44	19	−2 24.8	+10 8
3	2 23.2	3 42	15	0 20.9	1 52	21	2 25.1	10 6
5	2 22.2	3 35	17	0 17.9	2 0	23	2 25.4	10 4
7	2 21.1	3 28	19	0 14.9	2 7	25	2 25.6	10 1
9	2 20.0	3 22	21	0 11.8	2 15	27	2 25.8	9 58
11	+2 18.7	−3 16	23	+0 8.8	+2 23	29	−2 25.9	+ 9 55
13	2 17.4	3 9	25	0 5.8	2 31	Dec. 1	2 25.9	9 51
15	2 16.0	3 3	27	+0 2.8	+2 39	3	2 25.9	9 47
17	2 14.6	2 56		. . . .	. . .	5	2 25.8	9 43
19	2 13.0	2 50		. . . .	. . .	7	2 25.6	9 38
21	+2 11.4	−2 44	Aug. 27	−1 22.3	+7 2	9	−2 25.3	+ 9 33
23	2 9.8	2 37	29	1 24.7	7 10	11	2 25.0	9 27
25	2 8.0	2 31	31	1 27.0	7 18	13	2 24.6	9 21
27	2 6.2	2 25	Sept. 2	1 29.3	7 26	15	2 24.2	9 15
29	2 4.4	2 19	4	1 31.6	7 34	17	2 23.6	9 8
31	+2 2.5	−2 12	6	−1 33.8	+7 42	19	−2 23.0	+ 9 1
2	2 0.5	2 6	8	1 36.0	7 50	21	2 22.4	8 53
4	1 58.5	2 0	10	1 38.2	7 58	23	2 21.6	8 46
6	1 56.4	1 54	12	1 40.3	8 5	25	2 20.8	8 38
8	1 54.3	1 48	14	1 42.4	8 13	27	2 19.9	8 29
10	+1 52.1	−1 42	16	−1 44.4	+8 20	29	−2 18.9	+ 8 20
12	*+1 49.8*	*−1 36*	18	−1 46.5	+8 27	31	−2 17.8	+ 8 11

Position angle of satellite $p = p^1 + (P - P_0)$.

Apparent distance of satellite $s = F\frac{a(\rho)}{\rho}$.

Position angle of satellite $p = p^1 + (P - P_0)$.

Apparent distance of satellite $s = F\frac{a(\rho)}{\rho}$.

FOR MEAN MIDNIGHT.

APPARENT ORBITS OF THE SATELLITES OF URANUS AT DATE OF OPPOSI AUGUST 14, 1917, AS SEEN IN AN INVERTING TELESCOPE.

South

Apparent Apsides.

Date.	Position Angle.	App. Distances.	
		Ariel.	Umbriel.
	°	"	"
May 7	349.6	13 2	18.4
Aug. 15	350.2	13 9	19.4
Nov. 23	[redacted]	13.1	18.3

Apparent Apside

Date.	Position Angle.	App. D
		Titania
	°	"
May 7	[redacted]	[redacted]
Aug. 15	360.2	31.9
Nov. 23	[redacted]	30.0

North

GREENWICH MEAN TIME OF GREATEST ELONGATION.

ARIEL.				UMBRIEL.				TITANIA.				OBE	
North.		South.		North.		South.		North.		[redacted]		North a	
	d h		d h		d h		d h		d h		d h		
May	16 9 4	May	20 4 1	May	8 4 7	May	10 6 4	May	8 10 9	May	12 19 3	May	2
	23 22 8		27 17 5		16 11.6		18 13.3		17 3 8		21 12.2	June	
	31 12.3	June	4 7.0		24 18.5		26 20.2		25 20 7		30 5.1		1
June	8 1.7		11 20.4	June	2 1 4	June	4 3.1	June	3 13 6	June	7 22.1		1
	15 15 2		19 9 9		10 8.3		12 10.0		12 6.5		16 15.0		2
	23 4 6		26 23 4		18 15.2		20 17.0		20 23 5		25 8.0	July	
	30 18.1	July	4 12.8		26 22 1		28 23 9		29 16.4	July	4 0.9		
July	8 7 6		12 2.3	July	5 5 1	July	7 6 8	July	8 9.4		12 17 9		1
	15 21.0		19 15.8		13 12.0		15 13.7		17 2 4		21 10.8		2
	23 10.5		27 5 2		21 18 9		23 20 6		25 19 3		30 3 8		2
	31 0.0	Aug.	3 18 7		30 1 8	Aug.	1 3.6	Aug.	3 12.3	Aug.	7 20 8	Aug.	
Aug.	7 13.4		11 8 2	Aug.	7 8 8		9 10 5		12 5 2		16 13 7		1
	15 2.9		18 21 6		15 15 7		17 17.4		20 22 2		25 6 7		1
	22 16.4		26 11 1		23 22.6		26 0 4		29 15.2	Sept.	2 23 7		2
	30 5.9	Sept.	3 0.6	Sept.	1 5.6	Sept.	3 7.3	Sept.	7 8.2		11* 16 7		3
Sept.	6 19 3		10 14.1		9 12.5		11 14.2		16 1.2		20 9 6	Sept.	
	14 8 8		18 3.6		17 19 4		19 21.2		24 18.1		29 2.6		1
	21 22 3		25 17 0		26 2 4		28 4.1	Oct.	3 11.1	Oct.	7 19.6		2
	29 11.8	Oct.	3 6 5	Oct.	4 9 3	Oct.	6 11 1		12 4.1		16 12 6		2
Oct.	7 1 3		10 20 0		12 16 3		14 18 0		20 21.0		25 5.5	Oct.	
	14 14 8		18 9.5		20 23.2		23 1 0		29 14.0	Nov.	2 22.5		1
	22 4 2		25 23.0		29 6 2		31 7 9	Nov.	7 7.0		11 15.4		1
	29 17 7	Nov.	2 12 5	Nov.	6 13.1	Nov.	8 14.8		15 23.9		20 8 4		2
Nov.	6 7 2		10 1 9		14 20 0		16 21 8		24 16 9		29 1 3		3
	13 20 7		17 15 4		23 3 0		25 4.7	Dec	3 9.8	Dec.	7 18 3	Nov.	

In the above diagram the central circle represents the planet.

For Ariel every third greatest elongation is given, and for Umbriel every alternate o *intermediate ones* may be found by adding multiples of the period of the satellite.

Sidereal period of Ariel, 2ᵈ 12ʰ.489; of Umbriel, 4ᵈ 3ʰ.460; of Titania, 8ᵈ 16ʰ.941; of *13ᵈ 11ʰ.118.*

e from -thern gation.	Ariel. p^1	Ariel. F	Umbriel. p^1	Umbriel. F	Time from Northern Elongation. d	h	Titania. p^1	Titania. F	Time from Northern Elongation. d	h	Oberon. p^1	Oberon. F
h	°		°		d	h	°		d	h	°	
0	350.2	1.000	350.2	1.000	0	0	350.2	1.000	0	0	350.2	1.000
2	355.2	0.982	353.2	0.993	0	5	353.8	0.991	0	8	354.0	0.990
4	0.6	0.930	356.3	0.974	0	10	357.6	0.963	0	16	357.8	0.960
6	6.8	0.847	359.6	0.942	0	15	1.6	0.918	1	0	2.0	0.912
8	14.6	0.741	3.2	0.898	0	20	6.1	0.857	1	8	6.8	0.848
10	25.4	0.621	7.1	0.843	1	1	11.4	0.783	1	16	12.5	0.770
12	41.2	0.507	11.7	0.780	1	6	17.9	0.700	2	0	19.5	0.682
14	64.5	0.429	17.1	0.711	1	11	26.3	0.613	2	8	28.7	0.592
16	92.6	0.423	23.7	0.637	1	16	37.3	0.529	2	16	41.0	0.507
18	116.8	0.494	32.1	0.564	1	21	52.2	0.459	3	0	57.7	0.443
20	133.4	0.606	42.8	0.498	2	2	71.0	0.420	3	8	78.1	0.416
22	144.6	0.726	56.4	0.447	2	7	91.6	0.422	3	16	99.0	0.434
0	152.8	0.835	72.7	0.418	2	12	110.0	0.466	4	0	116.5	0.493
2	159.1	0.922	90.0	0.420	2	17	124.4	0.537	4	8	129.6	0.575
4	164.6	0.978	106.0	0.452	2	22	135.2	0.622	4	16	139.4	0.665
6	169.6	1.000	119.2	0.507	3	3	143.2	0.710	5	0	146.7	0.753
8	174.6	0.986	129.6	0.574	3	8	149.6	0.792	5	8	152.6	0.833
10	179.9	0.938	137.7	0.647	3	13	154.8	0.864	5	16	157.5	0.901
12	186.0	0.859	144.1	0.720	3	18	159.3	0.924	6	0	161.8	0.953
14	193.6	0.755	149.4	0.789	3	23	163.3	0.967	6	8	165.8	0.986
16	203.9	0.636	153.9	0.851	4	4	167.0	0.993	6	16	169.5	1.000
18	218.9	0.519	157.8	0.904	4	9	170.6	1.000	7	0	173.2	0.994
20	241.2	0.435	161.3	0.947	4	14	174.2	0.989	7	8	177.0	0.968
22	269.2	0.419	164.5	0.977	4	19	178.0	0.959	7	16	181.2	0.923
0	294.2	0.482	167.6	0.995	5	0	182.0	0.912	8	0	185.8	0.862
2	311.7	0.591	170.6	1.000	5	5	186.6	0.850	8	8	191.3	0.786
4	323.5	0.712	173.6	0.992	5	10	192.1	0.775	8	16	198.0	0.700
6	331.9	0.823	176.8	0.970	5	15	198.7	0.691	9	0	206.7	0.609
8	338.4	0.913	180.1	0.936	5	20	207.3	0.604	9	8	218.3	0.523
10	344.0	0.972	183.7	0.891	6	1	218.7	0.520	9	16	234.1	0.453
12	349.0	0.999	187.7	0.835	6	6	234.0	0.454	10	0	253.9	0.418
14	354.0	0.990	192.4	0.771	6	11	253.2	0.418	10	8	275.1	0.427
16			197.9	0.701	6	16	273.7	0.425	10	16	293.4	0.479
18			204.7	0.627	6	21	291.8	0.472	11	0	307.4	0.557
20			213.4	0.555	7	2	305.7	0.546	11	8	317.6	0.647
22			224.5	0.490	7	7	316.1	0.632	11	16	325.4	0.736
0			238.5	0.441	7	12	324.0	0.718	12	0	331.6	0.819
2			255.0	0.417	7	17	330.2	0.800	12	8	336.6	0.889
4			272.3	0.423	7	22	335.3	0.871	12	16	341.0	0.944
6			288.0	0.458	8	3	339.7	0.929	13	0	345.0	0.981
8			300.8	0.515	8	8	343.7	0.970	13	8	348.8	0.998
10			310.8	0.584	8	13	347.4	0.994	13	16	352.5	0.996
12			318.6	0.657	8	18	351.0	1.000				
14			324.9	0.730								
16			330.0	0.798								
18			334.4	0.859								
20			338.3	0.911								
22			341.7	0.952								
0			345.0	0.980								
2			348.0	0.997								
4			351.0	1.000								

Position angle of satellite $p = p^1 + (P - P_o)$.

Apparent distance of satellite $s = F\frac{a(\rho)}{\rho}$.

FOR GREENWICH MEAN NOON.

Date.	$P-P_0$	$\frac{a(\rho)}{\rho}$ Ariel.	Umbriel.	Titania.	Oberon.	Date.	$P-P_0$	$\frac{a(\rho)}{\rho}$ Ariel.	Umbriel.	Titani
	°	"	"	"	"		°	"	"	"
Apr. 20	−0.4	13.0	18.1	29.7	39.7	Aug. 18	0.0	13.9	19.4	31.9
25	0.5	13.0	18.2	29.8	39.9	23	+0.1	13.9	19.4	31.8
30	0.5	13.1	18.2	29.9	40.0	28	0.2	13.9	19.4	31.8
May 5	0.6	13.2	18.3	30.1	40.2	Sept. 2	0.2	13.9	19.4	31.8
10	0.6	13.2	18.4	30.2	40.4	7	0.3	13.9	19.3	31.7
15	−0.6	13.3	18.5	30.3	40.5	12	+0.4	13.8	19.3	31.6
20	0.6	13.3	18.6	30.4	40.7	17	0.4	13.8	19.2	31.6
25	0.6	13.4	18.6	30.6	40.9	22	0.5	13.8	19.2	31.5
30	0.6	13.4	18.7	30.7	41.0	27	0.5	13.7	19.1	31.4
June 4	0.6	13.5	18.8	30.8	41.2	Oct. 2	0.6	13.7	19.1	31.3
9	−0.6	13.5	18.9	30.9	41.4	7	+0.6	13.6	19.0	31.2
14	0.6	13.6	18.9	31.0	41.5	12	0.6	13.6	18.9	31.1
19	0.6	13.6	19.0	31.2	41.7	17	0.6	13.5	18.9	31.0
24	0.6	13.7	19.1	31.3	41.8	22	0.6	13.5	18.8	30.8
29	0.5	13.7	19.1	31.4	42.0	27	0.6	13.4	18.7	30.7
July 4	−0.5	13.8	19.2	31.5	42.1	Nov. 1	+0.6	13.4	18.6	30.6
9	0.4	13.8	19.2	31.6	42.2	6	0.6	13.3	18.6	30.4
14	0.4	13.8	19.3	31.6	42.3	11	0.6	13.3	18.5	30.3
19	0.3	13.9	19.3	31.7	42.4	16	0.6	13.2	18.4	30.2
24	0.3	13.9	19.4	31.8	42.5	21	0.6	13.1	18.3	30.0
29	−0.2	13.9	19.4	31.8	42.5	26	+0.5	13.1	18.2	29.9
Aug. 3	0.2	13.9	19.4	31.8	42.6	Dec. 1	0.5	13.0	18.2	29.8
8	−0.1	13.9	19.4	31.8	42.6	6	0.4	13.0	18.1	29.7
13	0.0	13.9	19.4	31.9	42.6	11	+0.4	12.9	18.0	29.6

SATELLITE OF NEPTUNE, 1917.

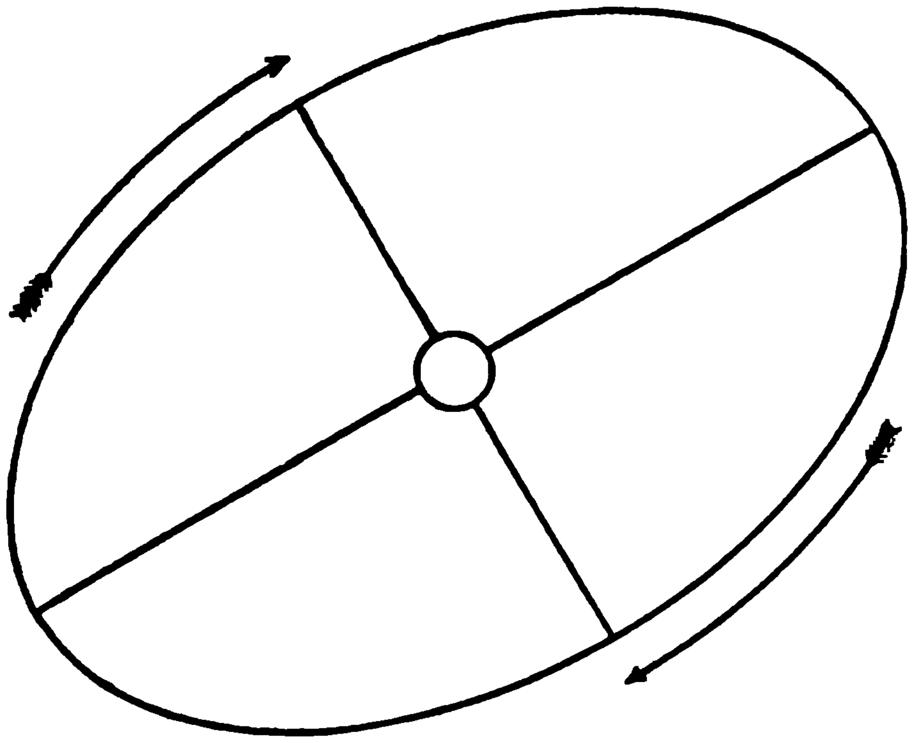
Time from Eastern Elongation.	p^1	F	Time from Eastern Elongation.	p^1	F	Date.	$P-P_0$	$\frac{a(\rho)}{\rho}$	Date.	P−I
d h	°		d h	°			°	"		°
0 0	120.1	1.000	3 0	297.8	0.999	Jan. 1	+0.7	16.8	May 1	−1.
0 3	115.3	0.995	3 3	292.8	0.988	6	0.5	16.8	6	1.
0 6	110.3	0.979	3 6	287.8	0.967	11	0.4	16.8	11	1.
0 9	105.1	0.953	3 9	282.4	0.937	16	0.2	16.8	16	1.
0 12	99.6	0.918	3 12	276.7	0.899	21	+0.1	16.8	21	−1.
0 15	93.6	0.877	3 15	270.4	0.855	26	−0.1	16.8	Oct. 2	+3.
0 18	86.9	0.831	3 18	263.4	0.807	31	0.2	16.8	7	3.
0 21	79.5	0.782	3 21	255.4	0.758	Feb. 5	0.4	16.8	12	3.
1 0	71.0	0.734	4 0	246.4	0.712	10	0.6	16.8	17	3.
1 3	61.5	0.692	4 3	236.4	0.674	15	0.7	16.8	22	3.
1 6	50.8	0.658	4 6	225.2	0.646	20	−0.8	16.7	27	+3.
1 9	39.2	0.638	4 9	213.3	0.634	25	1.0	16.7	Nov. 1	3.
1 12	27.2	0.634	4 12	201.2	0.638	Mar. 2	1.1	16.7	6	3.
1 15	15.3	0.646	4 15	189.6	0.658	7	1.2	16.6	11	3.
1 18	4.1	0.673	4 18	179.0	0.691	12	1.3	16.6	16	3.
1 21	354.0	0.712	4 21	169.4	0.734	17	−1.4	16.6	21	+3.
2 0	345.0	0.758	5 0	160.9	0.781	22	1.5	16.5	26	3.
2 3	337.0	0.806	5 3	153.4	0.830	27	1.5	16.5	Dec. 1	3.
2 6	330.0	0.854	5 6	146.8	0.877	Apr. 1	1.6	16.5	6	3.
2 9	323.7	0.899	5 9	140.8	0.918	6	1.6	16.4	11	3.
2 12	317.9	0.937	5 12	135.2	0.953	11	−1.6	16.4	16	+3.
2 15	312.6	0.967	5 15	130.0	0.979	16	1.6	16.3	21	3.
2 18	307.5	0.988	5 18	125.1	0.994	21	1.6	16.3	26	3.
2 21	302.6	0.999	5 21	120.2	1.000	26	−1.6	16.2	31	+3.

Position angle of satellite $p = p^1 + (P - P_0)$.

Apparent distance of satellite $s = F\frac{a(\rho)}{\rho}$.

'ARENT ORBIT OF THE SATELLITE OF NEPTUNE AT DATE OF OPPOSITION, JANUARY 23, 1917, AS SEEN IN AN INVERTING TELESCOPF.

South



North

Date.	Position Angle of Apsis.	Apparent Distance at Apsis.
	°	″
Jan. 23	120.1	16.8
May 3	118.7	16.2
Oct. 14	123 8	16.1
Dec. 33	123.2	16.7

GREENWICH MEAN TIME OF GREATEST ELONGATION.

East.		West.		East.		West.		East.		West.	
	d h		d h		d h		d h		d h		d h
.	2 0.2	Jan.	4 22.8	Mar.	25 7.8	Mar.	28 6.4	Oct.	11 1.2	Oct.	13 23.7
	7 21.3		10 19.9		31 4.9	Apr.	3 3 4		16 22.2		19 20.7
	13 18.5		16 17.0	Apr.	6 2.0		9 0 5		22 19.2		25 17.7
	19 15.6		22 14 1		11 23.0		14 21.6		28 16.2		31 14.7
	25 12.7		28 11.3		17 20.1		20 18.6	Nov.	3 13.2	Nov.	6 11.7
	31 9 8	Feb.	3 8 4		23 17.1		26 15.7		9 10.3		12 8.8
).	6 6.9		9 5 5		29 14.2	May	2 12.7		15 7.3		18 5.8
	12 4.1		15 2.6	May	5 11.2		8 9.7		21 4.3		24 2.9
	18 1.2		20 23 8		11 8.2		14 6.7		27 1.4		29 23.9
	23 22.3		26 20.9		17 5.2		20 3.7	Dec.	2 22.5	Dec.	5 21.0
r.	1 19 4	Mar.	4 18.0		23 2.2		26 0.7		8 19.5		11 18.1
	7 16 5		10 15.1		28 23.2		31 21.7		14 16.6		17 15.1
	13 13 6		16 12.2		. . . . .		. . . . .		20 13.7		23 12.2
	19 10.7		22 9 3	Oct.	5 4.2	Oct.	8 2 7		26 10.8		29 9.3

In the above diagram the central circle represents the planet.
The sidereal period of the satellite of Neptune is $5^d\ 21^h.044$.

MEAN TIME.

GREENWICH MEAN TIME.

PLANETARY CONFIGURATIONS.

h m			° ′
2	☌♆☾	. . . .	♆ + 1 56
–	♂	in ☊	
–	♀	in Perihelion.	
–	☿	in ☊	
–	⊕	in Aphelion.	
–	☾	Tot. ecl. invis. at Wash.	
–	☌♀♄	. . . .	♀ + 1 4
–	☌♀♆	. . . .	♀ + 1 43
–	☿	in Perihelion.	
14	☌♅☾	. . . .	♅ − 4 41
–	☌☿☉	Superior.	
53	☌♃☾	. . . .	♃ − 4 5
–	♀	Greatest Hel. Lat. N.	
41	☌♂☾	. . . .	♂ − 1 26
–	☿	Greatest Hel. Lat N.	
–	☉	Par. ecl. invis. at Wash.	
–	☌☿♄	. . . .	☿ + 1 25
–	☌☿♆	. . . .	☿ + 2 3
48	☌♄☾	. . . .	♄ + 2 33
52	☌♆☾	. . . .	♆ + 2 1
9	☌☿☾	. . . .	☿ + 4 11
12	☌♀☾	. . . .	♀ + 5 23
–	☌♄☉		
–	☌♆☉		
–	☌♄♆	. . . .	♄ + 0 39
20	☌♅☾	. . . .	♅ − 4 34
–	☿	in ☋	
51	☌♃☾	. . . .	♃ − 3 39
0	☌♂☾	. . . .	♂ + 0 42
–	☍♅☉		
3	☌♆☾	. . . .	♆ + 2 7
18	☌♄☾	. . . .	♄ + 2 55
–	☿	in Aphelion.	
1 21	☌☿☾	. . . .	☿ + 3 36
7 52	☌♀☾	. . . .	♀ + 6 33
7 –	☿	Greatest elong. E.	27 23
3 28	☌♅☾	. . . .	♅ − 4 30
2 –	□♃☉		
0 –	☿	Stationary.	
1 47	☌♃☾	. . . .	♃ − 3 14
3 –	☿	Greatest Hel. Lat. S.	
4 –	♀	in ☋	
1 53	☌♂☾	. . . .	♂ + 2 55
0 54	☌♆☾	. . . .	♆ + 2 18
9 12	☌♄☾	. . . .	♄ + 3 22
9 7	☌☿☾	. . . .	☿ + 1 31
2 –	☌☿☉	Inferior.	
0 30	☌♀☾	. . . .	♀ + 4 5
2 –	☌♂♆	. . . .	♂ + 1 18
8 1	☉	enters ♎, Autumn com.	
0 –	☿	Stationary.	
8 14	☌♅☾	. . . .	♅ − 4 33
9 –	☿	in ☊	
5 –	♃	Stationary.	

	d	h	m			° ′
Oct.	1	0	–	☌♂♄	. . . .	♂ + 0 40
	2	18	–	☿	in Perihelion.	
	4	4	–	☿	Greatest elong. W.	17 56
	4	21	27	☌♃☾	. . . .	♃ − 2 57
	9	8	54	☌♆☾	. . . .	♆ + 2 36
	9	21	25	☌♄☾	. . . .	♄ + 3 52
	10	7	36	☌♂☾	. . . .	♂ + 5 2
	13	1	–	☿	Greatest Hel. Lat. N.	
	14	4	–	♀	in Aphelion.	
	14	16	37	☌☿☾	. . . .	☿ + 7 33
	19	7	57	☌♀☾	. . . .	♀ − 0 8
	24	15	32	☌♅☾	. . . .	♅ − 4 44
	30	4	–	♅	Stationary.	
	30	14	–	□♆☉		
Nov.	1	4	25	☌♃☾	. . . .	♃ − 2 55
	3	6	–	☌☿☉	Superior.	
	5	10	–	♀	Greatest Hel. Lat. S.	
	5	12	–	☿	in ☋	
	5	17	16	☌♆☾	. . . .	♆ + 2 53
	6	8	32	☌♄☾	. . . .	♄ + 4 19
	6	16	–	□♄☉		
	8	1	37	☌♂☾	. . . .	♂ + 6 46
	9	13	–	♆	Stationary.	
	12	8	–	□♅☉		
	14	20	50	☌☿☾	. . . .	☿ + 1 48
	15	17	–	☿	in Aphelion.	
	18	2	46	☌♀☾	. . . .	♀ − 4 4
	20	21	43	☌♅☾	. . . .	♅ − 4 56
	26	4	–	♄	Stationary.	
	28	8	30	☌♃☾	. . . .	♃ − 3 7
	28	18	–	☍♃☉		
	29	20	–	♀	Greatest elong. E.	47 18
Dec.	3	1	39	☌♆☾	. . . .	♆ + 3 2
	3	17	42	☌♄☾	. . . .	♄ + 4 36
	6	2	–	☿	Greatest Hel. Lat. S.	
	6	15	37	☌♂☾	. . . .	♂ + 8 0
	11	16	–	□♂☉		
	13	–	–	☉	Ann. ecl. invis. at Wash.	
	15	11	42	☌☿☾	. . . .	☿ − 3 4
	16	18	–	☿	Greatest elong. E.	20 20
	17	13	1	☌♀☾	. . . .	♀ − 5 30
	18	4	47	☌♅☾	. . . .	♅ − 5 5
	21	21	46	☉	enters ♑, Winter com.	
	24	11	–	☿	Stationary.	
	25	0	–	♂	Greatest Hel. Lat. N.	
	25	2	–	☿	in ☊	
	25	10	46	☌♃☾	. . . .	♃ − 3 20
	27	–	–	☾	Tot. ecl. vis. at Wash.	
	29	17	–	☿	in Perihelion.	
	30	9	13	☌♆☾	. . . .	♆ + 3 0
	30	20	–	☌♀♅	. . . .	♀ + 0 35
	31	0	4	☌♄☾	. . . .	♄ + 4 37
	31	17	–	♀	in ☊	

No.	Place.	Latitude.	Reduction to Geocentric Latitude.	Altitude (Meters).	Log ρ (Including altitude).	Longitude from Greenwich.
		° ′ ″	′ ″			h m s
1	Abbadia, France . .	+43 22 52.2	−11 34.4	69	9.999317	+ 0 7 0.1
2	Adelaide, S. Australia .	−34 55 38.0 [a]	+10 52.4	41 [b]	9.999526	− 9 14 20.07 [a]
3	Adelaide, S. Australia .	−34 55 37.4 [c]	+10 52.4	. . .	9.999523	− 9 14 20.17 [c]
4	Albany, N. Y. . . .	+42 39 12.7 [a]	−11 33.1	70 [a]	9.999336	+ 4 55 7.12 [a]
5	Albany, N. Y. . . .	+42 39 49.5 [a]	−11 33.1	52	9.999335	+ 4 54 59.97 [a]
6	. . .	+36 47 50	−11 6.7	342	9.999501	− 0 12 8.38
7	. . .	+40 28 58.1 [d]	−11 26.7	370 [d]	9.999411	+ 5 20 5.39 [d]
8	. . .	+40 27 41.6	−11 26.6	. . .	9.999357	+ 5 20 2.93
9	. . .	+42 21 56.5 [e]	−11 32.5	110 [e]	9.999346	+ 4 50 5.93 [e]
10	Amherst, Mass. . . .	+42 22 17.1 [f]	−11 32.5	. . .	9.999338	+ 4 50 4.67 [f]
11	. . .	+42 16 48.7 [a]	−11 32.3	282 [a]	9.999320	+ 5 34 55.27 [a]
12	. . .	+44 15 39.2 [g]	−11 35.4	242	9.999307	+ 5 53 35.92 [g]
13	. . .	+43 45 14.4	−11 34.9	[illegible]	9.999316	− 0 45 1.30
14	. . .	−16 22 28.0 [h]	+ 6 15.2	2451 [h]	0.000052	+ 4 46 11.73 [h]
15	. . .	+54 21 12.7 [c]	−10 59.6	61 [c]	9.999040	+ 0 26 35.4 [c]
16	. .	+37 58 19.7 [i]	−11 14.3	107 [i]	9.999456	− 1 34 53 [i]
17	. .	+39 17 52.0 [j]	−11 21.5	36 [j]	9.999418	+ 5 6 29.1 [j]
18	. .	+49 53 6.0 [c]	−11 26.0	299 [c]	9.999167	− 0 43 33.57 [c]
19	. .	+41 25 18	−11 30.0	420	9.999391	− 0 8 28.0
20	. . .	+42 30 8.4	−11 32.8	. . .	9.999335	+ 5 56 7.4
21	Bergedorf, Germany .	+53 28 46.2	−11 6.1	35	9.999060	− 0 40 57.74
22	Berkeley, Cal. . . .	+37 52 23.6	−11 13.7	[illegible]	9.999458	+ 8 9 2.72
23	Berlin, Prussia . . .	+52 30 16.7 [k]	−11 12.5	47 [k]	9.999065	− 0 53 34.80 [k]
24	Berlin, Prussia . . .	+52 31 13.1	−11 12.4	. . .	9.999081	− 0 53 34.41
25	Berlin, Prussia . . .	+52 31 30.7	−11 12.4	. . .	9.999081	− 0 53 27.40
26	Berlin, Prussia . . .	+52 29 7	−11 12.6	[illegible]	9 999084	− 0 53 54.2
27	Berne, Switzerland .	+46 57 8.7	−11 34 2	573	9 999260	− 0 29 45.70 [a]
28	.	+47 14 59.0	−11 33 7	312	9 999235	0 23 57.13
29		+53 5 47	−11 8.7	56	9 999071	+ 0 31 40.9
30	. .	+39 9 56 [d]	−11 20 8	238 [d]	9 999435	+ 5 46 5 [d]
31	Bogota, Colombia . .	+ 4 35 55 2 [c]	− 1 50 8	2634	0 000170	+ 4 56 23.5
32	Bombay (Colaba), India	+18 53 36 2 [c]	− 7 5 1	14 [c]	9 999849	− 4 51 15 72 [c]
33	Bonn, Prussia . . .	+50 43 45 0 [k]	−11 22 3	62 [l]	9.999130	− 0 28 23 17 [k]
34	Bordeaux (Floirac), France	+44 50 7 2 [a]	−11 35 6	73	9 999281	+ 0 2 5 51 [a]
35	Boston, Mass. . . .	+42 20 58 [m]	−11 32.5	31 [m]	9 999341	+ 4 44 19.1 [m]
36	Boston, Mass.	+42 21 32 5	−11 32 5	48	9.999342	+ 4 44 15.0
37	. .	+54 12 9 6 [n]	−11 0.8	32 [n]	9 999042	− 0 40 31 02 [n]
38	Bremen, . .	+53 4 36	−11 8 8	. .	9 999067	− 0 35 15
39	Breslau, Prussia . .	+51 6 55 8 [k]	−11 20.4	147 [k]	9 999126	− 1 8 8.72 [k]
40	Brisbane, Queensland .	−27 28 0 0	+ 9 28.3	. . .	9 999691	−10 12 6.17
41	Brussels (Uccle), Belgium	+50 47 55.5 [a]	−11 21.9	105 [a]	9 999131	− 0 17 26 05 [a]
42	Brussels, Belgium . .	+50 51 10.6 [c]	−11 21.7	. . .	9.999123	− 0 17 28.02 [c]
43	Budapest, Hungary . .	+47 29 34.7 [c]	−11 33.2	131 [c]	9.999217	− 1 16 15.3 [c]
44	Cambridge, England .	+52 12 51.6	−11 14.3	28	9.999091	− 0 0 22.75
45	Cambridge, Mass. . .	+42 22 47 6 [o]	−11 32 6	24	9 999340	+ 4 44 31.05 [o]
46	.	−33 56 3.5 [p]	+10 43 6	13 [p]	9 999548	− 1 13 54 76 [p]
47		+39 8 8 9 [q]	−11 20 7	18 [q]	9 999421	− 0 33 14 9 [q]
48	Catania, Sicily . . .	+37 30 13 2 [c]	−11 11 4	49 [c]	9.999464	− 1 0 20.70 [c]
49	Charkow, Russia . . .	+50 0 9 9 [a]	−11 25 5	138 [r]	9.999153	− 2 24 55.75 [a]
50	Charlottesville, Va. . .	+38 2 1.2 [e]	−11 14.6	259 [e]	9.999465	+ 5 14 5.33 [e]

a
b
c
d ier.
e Center of large dome.
f Center of dome tower.
g Center of dome.
h Transit pier
i Cercle Syngros.
j Center of instrument house.
k Center of observatory.
l Floor of meridian room.
m Foot of pillar of 7-in. equa
n Cube of equatorial.
o Dome of 15-in. equatorial.
p 8-in. meridian circle.
q Zenith telescope.
r Barometer in meridian roo

Authority for— Latitude.	Longitude.	Description.
. Astron., Bruxelles, 1907.	*Les Obs. Astron.*, Bruxelles, 1907.	Obs. Paris Acad. of Sci., Hendaye.
from Govt. Astronomer, 1913.	Letter from Govt. Astronomer, 1913.	Govt. Obs., since 1884.
rom Govt. Astronomer, 1913.	Letter from Govt. Astronomer, 1913.	Govt. Obs., before 1884.
from Director, 1913.	Letter from Director, 1913.	Dudley Obs., since 1893.
from Director, 1913.	Letter from Director, 1913.	Dudley Obs., before 1893.
s. Astron., Bruxelles, 1907.	*Astron. Nach.*, Nr. 3993, 1905.	At Bouzaréah. Old Obs. 3′.8 S., 8s E.
cations of Obs., 1909.	*Publications* of Obs., 1909.	[a] Obs. Western Univ. of Pa., since 1905.
r from Director, 1897.	Letter from Director, 1897.	Obs. Western Univ. of Pa., before 1905.
r from Director, 1913.	Letter from Director, 1913.	Amherst College Obs., since 1903.
from Director, 1913.	Letter from Director, 1913.	Lawrence Obs., before 1903.
from Director, 1913.	Letter from Director, 1913.	Detroit Obs., Univ. of Mich.
otnote ([b]).	See footnote ([b]).	Underwood Obs., Lawrence College.
. dell'Osserv., 1900.	*Astron. Nach.*, Nr. 3993, 1905.	Royal Observatory.
rd Annals, 1903.	*Harvard Annals*, 1903.	Branch of Harvard Coll. Obs.
h Catalogue of Stars, 1840.	*Armagh Catalogue of Stars*, 1840.	Armagh Observatory.
les de l'Obs., 1910.	Letter from Director, 1913.	[c] National Observatory.
r from Director, 1913.	Letter from Director, 1913.	Johns Hopkins Univ. Obs.
r from Director, 1913.	*Astron. Nach.*, Nr. 3993, 1905.	Remeis Observatory.
s. Astron., Bruxelles, 1907.	*Les Obs. Astron.*, Bruxelles, 1907.	Fabra Obs., Acad. of Sci. and Arts.
r from Director, 1897.	Letter from Director, 1897.	Smith Obs., Beloit College.
r from Director, 1913.	*Astron. Nach.*, Nr. 3993, 1905.	Hamburg Obs., since 1909.
r from Director, 1897.	Letter from Director, 1897.	Students' Obs., Univ. of Cal.
n. Nach., Nr. 3545, 1898.	*Astron. Nach.*, Nr. 3993, 1905.	Royal Obs., since 1835.
r from Director, 1913.	Letter from Director, 1913.	Royal Obs., before 1835.
n. Nach., Nr. 3170, 1893.	*Astron. Nach.*, Nr. 3170, 1893.	Urania Observatory.
s. Astron., Bruxelles, 1907.	*Les Obs. Astron.*, Bruxelles, 1907.	Treptow Observatory.
ur Jahrbuch.	*Astron. Nach.*, Nr. 3202, 1893.	Observatory, Cantonal Univ.
n. Nach., Nr. 2805, 1887.	*Astron. Nach.*, Nr. 2805, 1887.	National Observatory.
h *Nautical Almanac.*	British *Nautical Almanac.*	Private Obs. of Earl of Rosse.
r from Director, 1913.	Letter from Director, 1913.	Kirkwood Obs., Univ. of Ind.
r from Director, 1913.	Letter from Director, 1913.	National Observatory.
r from Director, 1913.	Letter from Director, 1913.	Government Observatory.
r from Director, 1913.	*Astron. Nach.*, Nr. 3993, 1905.	Royal Observatory.
r from Director, 1897.	*Annales de l'Obs.*, 1885.	Obs., Univ. of Bordeaux.
r from Director, 1909.	Letter from Director, 1909.	Boston Univ. Obs., since 1908.
r from Director, 1895.	Letter from Director, 1895.	Boston Univ. Obs., before 1908.
zu Bothkamp, 1872.	Letter from Director, 1913.	Obs. of Herr von Bülow.
n. Nach., Nr. 15, 1822.	*Astron. Nach.*, Nr. 15, 1822.	Formerly Olber's Obs.
r from Director, 1897.	*Astron. Nach.*, Nr. 3993, 1905.	Royal University Obs.
h *Nautical Almanac.*	[e] British *Nautical Almanac.*	Brisbane Observatory.
r from Director, 1913.	Letter from Director, 1913.	Royal Obs., since 1891.
les de l'Obs., 1857.	Letter from Director, 1913.	Royal Obs., before 1891.
n. Nach., Nr. 2752, 1886.	*Astron. Nach.*, Nr. 2752, 1886.	University Observatory.
r from Director, 1879.	Letter from Director, 1879.	University Observatory.
rd Annals, 1887.	*U. S. C. and G. S. Report*, 1897.	Harvard College Obs.
len. Catalogue of Stars, 1885.	*Monthly Notices, R. A. S.*, Nov. 1908.	Royal Observatory.
otnote ([d]).	Letter from Director, 1913.	International Lat. Obs.
r from Director, 1913.	Letter from Director, 1913.	Royal Obs. of Catania and Etna.
les de l'Obs., 1904.	*Annales de l'Obs.*, 1904.	University Observatory.
r from Director, 1913.	Letter from Director, 1913.	Leander McCormick Obs., Univ. Va.

[a] Name of Western Univ. of Pa. changed in 1908; now the Univ. of Pittsburgh.
[b] *Professional Papers, Corps of Engineers, U. S. A.*, 1882.
[c] Old meridian circle 0″.4 S., 0s.1 W. of Cercle Syngros.
[d] *Resultate des Internationalen Breitendienstes*, 1900–1908.
[e] With the new value of the longitude of Sydney.

No.	Place.	Latitude.	Reduction to Geocentric Latitude.	Altitude (Meters).	Log ρ (Including altitude).	Longitude from Greenwich.
		° ′ ″	′ ″			h m s
51	Chicago, Ill.	+41 50 1.0	−11 31.2	. . .	[illegible]	+5 50 26.84
52	Christiania, Norway . .	+59 54 44.0 a	−10 4.6	25 a	9.998908	−0 42 53.50 a
53	Cincinnati, Ohio . . .	+39 8 19.8 b	−11 20.7	247 b	[illegible]	+5 37 41.40 b
54	Cincinnati, Ohio . . .	+39 6 26.5	−11 20.5	. . .	[illegible]	+5 37 59.00
55	Cleveland, Ohio . . .	+41 30 14.5 c	−11 30.2	215 c	9.999375	+5 26 25.86 c
56	Clinton, N. Y. . . .	+43 3 17.0	−11 33.9	276	9.999340	+5 1 37.45
[illegible]	Coimbra, Portugal . .	+40 12 24.5	−11 25.6	[illegible]	9.999400	+0 33 43.1
58	Columbia, Mo. . . .	+38 56 51.7 d	−11 19.7	225 c	[illegible]	+6 9 18.33 d
59	Columbus, Ohio . . .	+39 59 50.4 d	−11 24.7	233 d	9.999414	+5 32 2.60 d
60	Denmark .	+55 41 12.6	−10 48.6	[illegible]	9.999005	−0 50 18.69 f
61	. .	−31 25 15.5 g	+10 18.0	434 g	9.999634	+4 16 48.22 g
62	. . .	+50 3 52.0 a	−11 25.2	221 a	9.999157	−1 19 50.27 a
63	. . .	+54 21 18.0	−10 59 6	3	[illegible]	−1 14 39.6
64	. .	+30 18 51.8 h	−10 5.3	681 h	[illegible]	−5 12 11.76 h
65	. . . .	+39 40 36.4 a	−11 23.3	1644 i	9.999518	+6 59 47.72 a
66		+41 36 0	−11 30.5	296	[illegible]	+6 14 30.56
67		+58 22 47.2 a	−10 22.1	67 a	[illegible]	−1 46 53.22 a
68		+51 2 16.8	−11 20.8	121	9.999126	−0 54 54.74
[illegible]		+53 23 13.1 a	−11 6.7	86 a	9.999066	+0 25 21.1 a
70		+57 9 36	−10 34.8	141	[illegible]	+0 9 40.0
71	. .	+54 46 6.2 j	−10 56.4	107 k	9.999033	+0 6 19.75 j
72	Duseldor . .	+51 12 25.0 l	−11 19.9	46 l	9.999117	−0 27 2.69 l
73	Edinburgh, Scotland .	+55 55 30.0 a	−10 46.5	134 m	9 999007	+0 12 44.22 a
74	Edinburgh, Scotland .	+55 57 23.2 n	−10 46.2	106 o	[illegible]	+0 12 43.05 n
[illegible]	Elmira, N. Y.	+42 6 25	−11 31.9	. . .	[illegible]	+5 7 13.90
76	Evanston, Ill. . . .	+42 3 33 4	−11 31.8	175	9 999358	+5 50 42.3
77	.	+35 12 30.5	−10 54.7	2210	9.999667	+7 26 44 58
78	. .	+39 8 13 2 r	−11 20.7	165	9 999431	+5 8 47.73
79	.	+42 52 46 2	−11 33 6	152	9.999336	+5 8 1.00
80	Geneva, Switzerland .	+46 11 59 3 a	−11 35.2	407 a	9 999268	−0 24 36.61 a
81	Genoa, Italy . . .	+44 25 9.3 a	−11 35.5	105	9 999293	−0 35 41.28 a
82	Georgetown, D. C. . .	+38 54 26 7 b	−11 19.5	47	9 999429	+5 8 18.26 b
83	Glasgow, Mo. . . .	+39 13 45 6	−11 21.1	227	9.999433	+6 11 18.08
84	Glasgow, Scotland . .	+55 52 42 8 a	−10 46.9	55 p	9 999003	+0 17 10 55 a
85	Gotha, Germany . . .	+50 56 37 9 l	−11 21.2	322 a	9.999142	−0 42 50.51 l
86	Gotha, Germany . . .	+50 56 4.4 j	−11 21 2	360 j	9.999145	−0 42 55.09 j
87	.	+51 31 48 1 q	−11 18.2	161 q	9 999116	−0 39 46 22 q
88		+39 38 46 6 a	−11 23 1	262 a	9 999425	+5 47 24.36 a
89		+51 28 38 2 a	−11 18 5	49 a	9.999110	0 0 0.00 a
90	y	+53 33 6.0	−11 5.6	25	9 999057	−0 39 53 60 a
91	Hamburg Germany .	+53 32 51 3 d	−11 5.6	30 d	9.999058	−0 39 53.46 a
92	.	+43 42 15.3	−11 34.8	183	9.999317	+4 49 8 02
[illegible]	[illegible] . . .	+40 0 40 1 r	−11 24.8	.	9 999398	+5 1 12 70 r
94	Heidelberg, Baden .	+49 23 55 2 s	−11 27.8	567 s	9.999198	−0 34 53.13 s
95	Heidelberg, Baden .	+49 23 55.7 t	−11 27 8	570 t	9.999198	−0 34 52.96 t
96	Heidelberg, Baden . .	+49 24 34.3 l	−11 27.8	126 l	9.999168	−0 34 46.80
97	Helsingfors, Finland .	+60 9 42.3 a	−10 1 5	33 a	9.998903	−1 39 49.10 a
98	Herény, Hungary . .	+47 15 47 4	−11 33 7	229	9.999229	−1 0 24.7
99	Hong Kong, China .	+22 18 13 2 j	− 8 7 4	33 j	9 999793	−7 36 41.86
100	Iowa City, Iowa . .	+41 40 0	−11 30.7	183	9 999369	+6 6 6

a
b
c
d
e ark.
f
g

h sector pillar.
i
j
k room.
l
m
n In-

o Floor of main building.
p Floor of meridian circle roo
q Position of meridian circle
r Zenith telescope.
s Repsold meridian circle
t Bruce telescope.

Authority for— Latitude.	Authority for— Longitude.	Description.
U. S. Lake Survey, 1864.	Smithsonian *Report*, 1886.	[a] Dearborn Observatory.
Astron. Nach., Nr. 3193, 1893.	*Astron. Nach.*, Nr. 3993, 1905.	University Observatory.
Publications of the Obs., 1908.	*Astronomical Journal*, 1897.	Cincinnati Obs., since 1873.
Letter from Director, 1897.	*Astronomical Journal*, 1854.	Cincinnati Obs. before 1873.
Letter from Director, 1913.	Letter from Director, 1913.	Case Obs., Case School of Appl'd Sci.
Astron. Nach., Nr. 2553, 1883.	*Astron. Nach.*, Nr. 2553, 1883.	Litchfield Obs., Hamilton College.
Eph. Astron. de Coimbra, 1889.	*Eph. Astron. de Coimbra*, 1889.	University Observatory.
Trans. Acad. of Sci. of St. Louis, 1894.	*Trans. Acad. of Sci. of St. Louis*, 1894.	Laws Obs., Univ. of Mo.
Letter from Director, 1913.	Letter from Director, 1899.	McMillin Obs., State Univ.
British *Nautical Almanac*.	*Astron. Nach.*, Nr. 3993, 1905.	University Observatory.
Resultados del Obs., 1887.	*Resultados del Obs.*, 1887.	National Observatory.
Letter from Director, 1913.	Letter from Director, 1913.	Imperial and Royal Obs.
Letter from Director, 1897.	Letter from Director, 1897.	Obs. of the School of Navigation.
Great Trig. Survey of India, 1906.	Letter from Supt. of Survey, 1913.	Haig Obs., Trig. Survey of India.
Letter from Director, 1913.	Letter from Director, 1913.	Chamberlin Obs., Univ. of Denver.
Les Obs. Astron., Bruxelles, 1907.	*Les Obs. Astron.*, Bruxelles, 1907.	Drake Univ. Obs.
Publikationen der Sternw., 1911.	*Astron. Nach.*, Nr. 3993, 1905.	Imperial University Obs.
Berliner Jahrbuch.	*Berliner Jahrbuch*.	[b] Baron Engelhardt's Obs.
Trans. Royal Dublin Soc., 1889.	*Trans. Royal Irish Acad.*, 1838.	Dunsink Obs., Trinity College.
Letter from Royal Astronomer, 1897.	Letter from Royal Astronomer, 1897.	[c] Lord Crawford's Obs.
Letter from Director, 1913.	Letter from Director, 1913.	University Observatory.
Astron. Nach., Nr. 643, 1848.	Letter from Director, 1913.	Municipal Obs., Bilk.
Monthly Notices, R. A. S., 1907.	Letter from Director, 1913.	Royal Obs. since 1895; Blackford Hill.
Monthly Notices, R. A. S., 1836.	*Edinburgh Observations*, 1858.	[d] Royal Obs. before 1895; Calton Hill.
Letter from Director, 1912.	Letter from Director, 1912.	Elmira College Obs.
Letter from Director, 1893.	Letter from Director, 1893.	Dearborn Obs., North Western Univ.
British *Nautical Almanac*.	British *Nautical Almanac*.	Lowell Observatory.
See footnote ([j]).	See footnote ([k]).	International Lat. Obs.
Les Obs. Astron., Bruxelles, 1907.	*Les Obs. Astron.*, Bruxelles, 1907.	Smith Observatory.
Memoire par J. Pidoux, 1900.	*Astron. Nach.*, Nr. 3993, 1905.	Municipal Observatory.
Letter from Director, 1897.	*Astron. Nach.*, Nr. 3993, 1905.	Hydrographic Institute.
See footnote ([e]).	See footnote ([e]).	Georgetown College Obs.
Astron. Nach., Nr. 2625, 1884.	*Washington Observations*, 1877.	Morrison Observatory.
First Glasgow Catalogue, 1870.	*Monthly Notices, R. A. S.*, 1865.	University Observatory.
Letter from Director, 1913.	Letter from Director, 1913.	Ducal Obs. since 1857.
Letter, Director new Obs., 1913.	Letter, Director new Obs., 1913.	Ducal Obs. before 1857.
Astron. Nach., Nr. 4428, 1910.	*Astron. Nach.*, Nr. 3993, 1905.	Royal University Obs.
Letter from Director, 1912.	Letter from Director, 1912.	McKim Obs., De Pauw Univ.
Greenwich Observations, 1910.	*Greenwich Observations*, 1910.	[f] Royal Observatory.
Letter, Director new Obs., 1913.	*Astron. Nach.*, Nr. 3993, 1905.	[g] Hamburg Observatory before 1909.
Letter from Director, 1913.	Letter from Director, 1913.	[h] Imperial Marine Obs.
Letter from Director, 1894.	Letter from Director, 1894.	Shattuck Obs., Dartmouth College.
Proc. Amer. Ph. Soc., 1883.	*Proc. Amer. Ph. Soc.*, 1883.	Haverford College Obs.
Letter from Director, 1913.	Letter from Director, 1913.	Astron. Institute, Königstuhl Obs.
Publik. des Obs., Königstuhl, 1902.	*Publik. des Obs., Königstuhl*, 1902.	Astrophys. Inst., Königstuhl Obs.
Publik. des Obs., Königstuhl, 1902.	*Publik. des Obs., Königstuhl*, 1902.	[i] Dr. Wolf's Obs. before 1898.
Letter from Director, 1913.	*Astron. Nach.*, Nr. 3993, 1905.	Imperial Univ. Obs.
Astron. Nach., Nr. 2633, 1884.	British *Nautical Almanac*.	Astrophysical Observatory.
Hong Kong Observations, 1897.	Letter from Director, 1897.	Colonial Observatory.
Les Obs. Astron., Bruxelles, 1907.	*Les Obs. Astron.*, Bruxelles, 1907.	Obs., Univ. of Iowa.

[a] Transferred to Evanston, Ill., in 1887.
[b] Instruments transferred to Univ. of Kasan in 1897.
[c] Instruments transferred to Royal Obs. at Edinburgh in 1896.
[d] City Obs. since 1896.
[e] Based upon data from the U. S. C. and G. Survey.
[f] *Point of reference before 1851*, 7½ ft. N., 19 ft. W.
[g] *At Bergedorf since 1909.*
[h] *Transit instrument before 1908*, 0″.5 N., 0s.04 W.
[i] *Instruments transferred to the* Astrophysical Institute of the Königstuhl Obs. in 1898.
[j] *Resultate des Internationalen Breitendienstes*, 1900–1908.
[k] *Resultate des Internationalen Breitendienstes*, Band I, 1903.

No.	Place.	Latitude.	Reduction to Geocentric Latitude.	Altitude (*Meters*).	Log ρ (*Including altitude*).	Longitude from Greenwich.
		° ′ ″	′ ″			h m s
101	Ithaca, N. Y.	+42 26 47.3 a	−11 32.6	256 a	9.999354	+5 5 55.99 e
102	Ithaca, N. Y.	+42 26 51.4	−11 32.6	. . .	9.999337	+5 5 56.47
103	.	+18 24 51 b	− 6 55.9	540 b	9.999892	+5 11 29.48 b
104	J .	+50 55 34.9 c	−11 21.3	165 c	9.999132	−0 46 20.22 c
105	Jena, . .	+50 55 35.8	−11 21.3	155	9.999131	−0 46 20.31
106	Jena, . .	+50 56 11 0	−11 21.3	174	9.999132	−0 46 20.73
107		−26 10 54.6 d	+ 9 9.8	1804 d	9.999840	−1 52 18.0 d
108		+46 31 41.7 b	−11 34.8	117 e	9.999240	−1 15 54.12 b
109		+55 50 20.0 f	−10 47.3	98 f	9.999007	−3 15 15.61 f
110	Kasan, Russia . . .	+55 47 23.9 g	−10 47.7	79 g	9.999007	−3 16 29.00 g
111	Kew, England . . .	+51 28 6	−11 18.5	10	9.999108	+0 1 15.1
112	. . . . . .	+50 27 10.0 w	−11 23.5	179 f	9.999145	−2 2 0.56 f
113	. . . . .	+54 20 27.6 f	−10 59 7	52 f	9.999040	−0 40 35.45 f
114	.	+47 41 54.8	−11 32.8	. . .	9.999202	−1 18 11.7
115	.	+54 42 50.5 f	−10 56.8	24 f	9.999029	−1 21 58.97 f
116		+48 3 23.1 f	−11 32.0	384 f	9.999220	−0 56 31.58 f
117		−34 54 31.8 h	+10 52.2	18 h	9.999525	+3 51 44.8 h
118		+52 9 19.8 f	−11 14.6	6 f	9.999090	−0 17 56.15 f
119	Leipzig, Saxony . . .	+51 20 5.9 i	−11 19.2	119 i	9.999118	−0 49 33.92 i
120	Leipzig, Saxony . . .	+51 20 20.1	−11 19.2	. . .	9.999110	−0 49 29.92
121	Liege, Belgium . . .	+50 37 6	−11 22.8	127	9.999137	−0 22 15.44
122	Lisbon (Tapada), Portugal	+38 42 30.5 j	−11 18.5	95 j	9.999427	+0 36 44.68 j
123	Liverpool, England . .	+53 24 4.8	−11 6.6	61	9.999064	+0 12 17.33
124	Liverpool, England . .	+53 24 47.8	−11 6.5	. . .	9.999059	+0 12 0.11
125	Lund, Sweden . .	+55 41 51.6 i	−10 48.5	38	9.999006	−0 52 44.97 i
126	Lund, Sweden . . .	+55 52 12.0	−10 47.0	. . .	9.999000	−0 52 47.50
127	Lussinpiccolo, Austria .	+44 32 11.0	−11 35 5	42	9 999286	−0 57 52 41
128	. . . .	+45 41 41.0	11 35.5	299	9 999274	−0 19 8 52 k
129	. . . .	+43 4 36 8 f	−11 33.9	292 l	9 999340	+5 57 37 90 f
130	Madras, India . . .	+13 4 8.0 f	− 5 5.5	7	9 999926	−5 20 59 14
131	Madrid, Spain . . .	+40 24 30 0 m	−11 26.4	655 m	9 999433	+0 14 45 09 m
132	Manila, P. I.	+14 34 41	− 5 38.2	3	9 999908	−8 3 54.2
133	Mare Island, Cal . .	+38 5 55 8 n	−11 15 0	18 n	9 999447	+8 9 5.63 n
134	Markree, Ireland . .	+54 10 31.8	−11 1 0	45	9.999044	+0 33 48 4
135	Marseilles, France . .	+43 18 19 f	−11 34 3	75 o	9 999320	−0 21 34.55
136	Marseilles, France . .	+43 17 52	−11 34 3	27	9.999317	−0 21 28.1
137	Mauritius (Port Louis) .	−20 5 39	+ 7 27.7	54	9 999832	−3 50 12.6
138	.	−37 49 53 2 p	+11 13 4	28 q	9.999454	−9 39 53 92 q
139	. .	+48 18 18	−11 29.8	162	9.999185	−0 8 55 6
140	Middletown, Conn. . .	+41 33 16 0	−11 30 4	. . .	9 999359	+4 50 37.18
141	Milan, Italy	+45 27 59.3	−11 35.6	120	9 999268	−0 36 45.88
142	Minneapolis, Minn. . .	+44 58 40 0 r	−11 35.7	260 r	9 999290	+6 12 56.84
143	Mizusawa, Japan .	+39 8 3 6 z	−11 20 7	62	9 999424	−9 24 30 75
144	Italy . .	+44 38 51 4	−11 35.6	64	9 999285	−0 43 43.40
145	. .	+45 30 20 s	−11 35 6	57 s	9 999262	+4 54 18.63
146	Moscow (Presnia), Russia	+55 45 19 5	−10 48 0	150 f	9 999012	−2 30 17.03
147	Mount Hamilton, Cal. .	+37 20 25 6 r	−11 10 4	1284 r	9.999552	+8 6 34 89
148	Mount Wilson, Cal . .	+34 12 59 5 t	−10 46 2	1799 t	9 999663	+7 52 14 33
149	Mount Wilson, Cal. . .	+34 12 55	−10 46 1	1727 u	9 999658	+7 52 14 3
150	Munich, Bavaria .	+48 8 45.5 r	−11 31.7	529 r	9.999227	−0 46 26 02

a ... oom.
b
c
d
e
f
g
h
i Center of observatory.
j
k SE
l
m
n
o
p
q Floor of room.
lan circle.
r Transit instrument.
s East transit pier.
t Snow telescope pier.
u Floor.
v West dome.
w Photographic equatorial of prime vertical transit
z Zenith telescope.

Authority for— Latitude.	Authority for— Longitude.	Description.
Letter from the Dean, 1913.	Letter from the Dean, 1913.	[a] Fuertes Obs., Cornell Univ.
Letter from the Dean, 1913.	Letter from the Dean, 1913.	[b] Fuertes Obs., Cornell Univ.
Memoirs, R. A. S., 1879.	See footnote ([c]).	Mr. Hall's Obs., Montego Bay.
Letter from Director, 1913.	Letter from Director, 1913.	Univ. Obs., since 1888.
Letter, Director new Obs., 1913.	Letter, Director new Obs., 1913.	Univ. Obs., before 1888.
V. J. S. Astron. Gesell., 1910.	*V. J. S. Astron. Gesell.*, 1910.	The late Dr. Winkler's Obs.
Transvaal Obs. *Circular*, 1910.	Transvaal Obs. *Circular*, 1910.	Union Obs., formerly Transvaal Obs.
Letter from Director, 1913.	Letter from Director, 1913.	Archiepiscopal Haynald Obs.
Letter from Director, 1913.	Publications of the Obs., 1911.	Engelhardt Obs., Univ. of Kasan.
Publications of the Obs., 1911.	Letter from Director, 1913.	University Observatory.
Letter from Director, 1897.	Letter from Director, 1897.	Meteorological Obs., London.
Annales de l' Obs., Vol. IV, 1893.	*Astron. Nach.*, Nr. 3993, 1905.	Imperial Univ. Obs.
Les Obs. Astron., Bruxelles, 1907.	*Astron. Nach.*, Nr. 3993, 1905.	[d] Royal University Obs.
Les Obs. Astron., Bruxelles, 1907.	*Les Obs. Astron.*, Bruxelles, 1907.	Near Aszòd, Hungary.
Letter from Director, 1913.	*Astron. Nach.*, Nr. 3993, 1905.	Royal University Obs.
Letter from Director, 1897.	*Astron. Nach.*, Nr. 3993, 1905.	Obs. of the Benedictines.
Letter from Director, 1913.	Letter from Director, 1913.	National Univ. Obs.
Letter from Director, 1913.	*Astron. Nach.*, Nr. 3993, 1905.	University Observatory.
Letter from Director, 1913.	*Astron. Nach.*, Nr. 3993, 1905.	University Obs., since 1861.
Letter, Director new Obs., 1913.	Letter, Director new Obs., 1913.	University Obs., before 1861.
Les Obs. Astron., Bruxelles, 1907.	*Les Obs. Astron.*, Bruxelles, 1907.	University Obs., Cointe.
Letter from Director, 1913.	*Astron. Nach.*, Nr. 3202, 1893.	Obs. of Lisbon.
Monthly Notices, R. A. S., 1894.	*Monthly Notices, R. A. S.*, 1894.	Bidston, Birkenhead, since 1867.
British *Nautical Almanac*, 1872.	British *Nautical Almanac*, 1872.	Liverpool Obs., before 1867.
Letter from Director, 1913.	*Astron. Nach.*, Nr. 3993, 1905.	Royal Univ. Obs., since 1867.
Letter, Director new Obs., 1913.	Letter, Director new Obs., 1913.	Royal Univ. Obs., before 1867.
Letter from Director, 1897.	Letter from Director, 1897.	Manora Observatory.
Letter from Director, 1897.	*Astron. Nach.*, Nr. 3202, 1893.	Obs. of the Univ., St. Genis Laval.
Publications of the Obs., 1892.	Letter from Director, 1912.	Washburn Obs., Univ. of Wis.
Great Trig. Survey of India, 1906.	*Great Trig Survey of India*, 1901.	Obs. founded by East India Co.
Annuario del Obs., 1912.	*Astron. Nach.*, Nr. 3993, 1905.	Astron. and Meteorolog. Obs.
Les Obs. Astron., Bruxelles, 1907.	*Les Obs. Astron.*, Bruxelles, 1907.	Meteorological Observatory.
Letter from Director, 1913.	*Lick Obs. Bulletin*, 1908.	Chronom. and Time Sta., Navy Yd.
Astron. Nach., Nr. 758, 1851.	British *Nautical Almanac*, 1901.	Col. Cooper's Observatory.
Letter from Director, 1913.	*Astron. Nach.*, Nr. 3993, 1905.	See footnote ([e]).
Letter, Director new Obs., 1913.	Letter, Director new Obs., 1913.	See footnote ([f]).
Mag. and Meteor. *Results*, 1908.	Mag. and Meteor. *Results*, 1908.	Royal Alfred Obs.
Astron. Results, 1881–84.	[i] *Astron. Results*, 1881–84.	[g] Government Observatory.
Les Obs. Astron., Bruxelles, 1907.	*Les Obs. Astron.*, Bruxelles, 1907.	Seine-et-Oise, near Paris.
Letter from Director, 1894.	Letter from Director, 1894.	Wesleyan University Obs.
Pubbl. del R. Osserv., 1914.	*Astron. Nach.*, Nr. 3993, 1905.	Royal Observatory, Brera.
Letter from Director, 1913.	Letter from Director, 1913.	Obs. Univ. of Minn.
See footnote ([h]).	*Les Obs. Astron.*, Bruxelles, 1907.	International Lat. Obs.
Letter from Director, 1913.	Letter from Director, 1913.	Royal Univ. Geophysical Obs.
Letter from Director, 1912.	*U. S. C. and G. S. Report*, 1897.	McGill University Obs.
Les Obs. Astron., Bruxelles, 1907.	*Astron. Nach.*, Nr. 3993, 1905.	Obs. of the Imperial Univ.
Publications of the Obs., 1900.	*U. S. C. and G. S. Report*, 1897.	Lick Obs., Univ. of Cal.
Astrophysical Journal, 1906.	*Astrophysical Journal*, 1906.	Solar Obs., Carnegie Inst.
Letter from C. G. Abbot, 1912.	Letter from C. G. Abbot, 1912.	Branch of Smithson. Astrophys. Obs.
Letter from Director, 1897.	*Astron. Nach.*, Nr. 3993, 1905.	Royal Observatory.

[a] Since 1902.
[b] Before 1902.
[c] *British Report on Transit of Venus*, 1882.
[d] Old position of meridian circle, 0″.9 N., 0s.12 E.
[e] National Obs., Univ. of Aix-Marseilles, since 1864–66.
[f] National Obs., at Accoules, before 1864–66.
[g] Transferred from Williamstown in 1861.
[h] *Resultate des Internationalen Breitendienstes*, 1900–1908.
[i] With the new values of the longitudes of Adelaide and Sydney.

No.	Place.	Latitude.	Reduction to Geocentric Latitude.	Altitude (Meters).	Log ρ (Including altitude).	Longitude from Greenwich.
		° ′ ″	′ ″			h m s
151		+40 51 46.3	−11 28.1	164	9.999388	−0 57 1.70
152		+36 8 54.4 [b]	−11 2.0	172 [c]	[redacted]	+5 47 12.2
153		+46 59 50.6	−11 34.1	488	[redacted]	−0 27 49.90
154		+40 30 1.4 [b]	−11 26.7	21 [b]	9.999387	+4 57 47.45
155	New Haven, Conn. . .	+41 19 22.3	−11 29.6	40	9.999368	+4 51 40.56
156	New Haven, Conn. . .	+41 18 36.5	−11 29.6	. . .	9.999365	+4 51 42.16
157	New York, N. Y. . .	+40 48 34.6	−11 27.9	25	9.999380	+4 55 50
158	New York, N. Y. . .	+40 45 23.1	−11 27.7	. . .	[redacted]	+4 55 53.64
159	. .	+43 43 16.9 [e]	−11 34.9	378	[redacted]	−0 29 12.15
160	. .	+46 58 22.1	−11 34.2	55	[redacted]	−2 7 58.78
161	.	+42 19 1.9 [b]	−11 32.4	70 [b]	9.999345	+4 50 33.10
162	. .	+44 27 41.6 [f]	−11 35 5	290 [f]	9.999305	+6 12 35.92
163	. .	+37 48 5 [d]	−11 13.2	11 [d]	9.999454	+8 9 6.55
164	. .	+46 28 37.5	−11 34.9	. . .	[redacted]	−2 3 2.18
165	Odessa, Russia . . .	+46 28 36.7 [d]	−11 34.9	55 [d]	[redacted]	−2 3 2.04
166	O-Gyalla, Hungary . .	+47 52 27.3	−11 32.4	113	[redacted]	−1 12 45.49
167	Omaha, Nebr. . . .	+41 16 5.6 [b]	−11 29.5	344 [b]	[redacted]	+6 23 48.96
168	Orono, Me.	+44 54 0	−11 35.6	38	[redacted]	+4 34 40.3
169	Ottawa, Canada . . .	+45 23 39.1 [d]	−11 35.6	85 [g]	[redacted]	+5 2 51.98
170	Oxford, Miss.	+34 22 12.6	−10 47.5	. . .	[redacted]	+5 58 7.18
171	. .	+51 45 35.6 [d]	−11 16.9	65 [h]	[redacted]	+0 5 2.6
172	. .	+51 45 34.2	−11 16.9	64	[redacted]	+0 5 0.40
173	. . .	+45 24 1.0 [i]	−11 35.6	81 [j]	9 999263	−0 47 29.13
174	. . .	+38 6 44.0 [k]	−11 15.1	76 [d]	[redacted]	−0 53 25.87
175	. . .	+48 50 11.2 [l]	−11 29.8	67 [m]	9.999178	−0 9 20.93
176	Perth, West Australia	−31 57 8 9 [d]	+10 23 8	60	9.999597	−7 43 21 51
177	'a. .	+39 58 2 1 [o]	−11 24.6	74 [o]	9 999404	+5 1 6 81
178	.	+44 51 48 6 [d]	11 35.6	32 [d]	9 999277	−0 55 23 07
179	ia	+52 22 56 0 [p]	−11 13 3	97 [p]	9.999091	−0 52 15 86
180	Y	+41 41 18	−11 30.8	61	9.999360	+4 55 33 6
181		+50 5 16 0 [o]	−11 25.1	197 [o]	9.999155	−0 57 40.28
182	N. J. . .	+40 20 55.8	−11 26.1	73	9 999395	+4 58 39.44
183	Princeton, N. J.	+40 20 57.8 [d]	−11 26.1	65 [d]	9.999394	+4 58 37 61
184	Providence, R. I. . .	+41 50 21	−11 31.2	64	9.999356	+4 45 35 95
185	Providence, R. I	+41 49 46 4	−11 31.2	. . .	9 999352	+4 45 37.64
186	.	+59 46 18.7 [o]	−10 6.2	75 [q]	9 998914	−2 1 18.57
187	.	+46 47 59 2	−11 34.4	90	9.999231	+4 44 52.71
188	. . .	− 0 14 0	+ 0 5.6	2908	0 000198	+5 14 6 66
189	. .	+56 57 9 3	−10 36.9	. . .	9.998974	−1 36 28 10
190	razil	−22 54 23 8 [o]	+ 8 17.7	62 [o]	9 999784	+2 52 41.4
191	Rome, Italy . . .	+41 53 53 6 [d]	−11 31.3	51 [j]	9.999354	−0 49 55.12
192	Rome, Italy . . .	+41 53 33.6 [d]	−11 31.3	65 [q]	9 999355	−0 49 56 34
193	Rome, Italy . . .	+41 54 12.4 [d]	−11 31.4	100 [d]	9 999357	−0 49 48 02
194	Rome, Italy . .	+41 54 16 7	−11 31.4	75 [j]	9.999355	−0 49 49.28
195	San Fernando, Spain	+36 27 42.0 [s]	−11 4.3	30 [s]	9 999488	+0 24 49 32
196	San Fernando, Spain	+36 31 7	−11 4.7	. . .	9.999485	+0 25 10.82
197	San Francisco, Cal.	+37 47 27.9	−11 13.2	. . .	9.999454	+8 9 42.86
198	San Luis, Arg. Rep.	−33 17 45 7	+10 37.6	800	9 999616	+4 25 22
199	Santiago, Chile . .	−33 26 42 [d]	+10 39 0	520 [d]	9.999594	+4 42 46.0
200	Santiago, Chile . . .	−33 26 25	+10 38 9	619	9.999600	+4 42 36.5
201	Santiago, Chile .	−33 33 46 [b]	+10 40.1	580 [b]	9.999595	+4 42 46

teps.

[g] Bench mark in east wall.

[h] Barometer basin.
[i] Axis of tower.
[j] Barometer
[k] Center of south dome
[l] South facade of observatory.
[m] Level of obs. terrace.
[n] Cassini's Meridian.

[o] Center of dome.
[p] Center of middle dome.
[q] Main floor.
[r] Tower of school.
[s] Center of building, ground
[t] West transit pier.

[illegible]	Observatory of Paris.
, 1908.	Government Observatory.
13.	Flower Obs., Univ. of Pa.
13.	
1905	Obs.
0.	
905	Royal Obs.
3.	Univ.
	Obs. Univ.
	Lad
1879.	Mr.
1905.	Obs. Central Nicolas.
12.	
97.	
1905.	
13.	Royal Obs. at Roman College.
1905.	Univ. Obs. at Capitol.
13.	, since 1906–7.
1905.	
13.	Naval Obs., since 1797.
3.	1797.
7.	
11.	
13.	862.
3.	1862.
13.	National Obs., Espejo.

5 feet W.
Royal Hydrographic Office.
Determinations of Longitudes on the East Coast of South America, 1880.

ntiago.
C. and G. Survey.
tude of Sydney.

No.	Place.	Latitude.	Reduction to Geocentric Latitude.	Altitude (*Meters*).	Log ρ (*Including altitude*).	Longitude from Greenwich.
		° ′ ″	′ ″			h m s
202	South Bethlehem, Pa. .	+40 36 23.2 a	−11 27.2	110	9.999391	+ 5 1 31.96
203	South Hadley, Mass. .	+42 15 18.2 b	−11 32.2	76 b	9.999346	+ 4 50 20.40
204	St. Louis, Mo. . . .	+38 38 3.0	−11 18.1	. . .	9.999432	+ 6 0 49.26
205	St. Petersburg, Russia .	+59 56 32.0	−10 4.2	4	9.998906	− 2 1 11.4
206	Stockholm, Sweden .	+59 20 32.7 c	−10 11.3	44 c	[illegible]	− 1 12 13.97
207	Stonyhurst, England .	+53 50 40	−11 3.4	117 c	9.999056	+ 0 9 52.68
208	. .	+48 35 0.3 c	−11 30.5	144 c	9.999190	− 0 31 4.52
209	. .	+39 54 23.3	−11 24.3	. . .	9.999401	+ 5 1 24.89
210	. .	−33 51 41.1	+10 42.9	44	9.999552	−10 4 49.31
211	. .	+43 2 13.1	−11 33.9	160	[illegible]	+ 5 4 33.36
212	.	+43 0 48.8 h	−11 33.8	137 u	9.999332	+ 5 4 34.31
213	.	+19 24 17.9 c	− 7 14.8	2285 c	[illegible]	+ 6 36 46.67
214	.	+41 19 31.3	−11 29.6	457	[illegible]	− 4 37 10.80
215	.	+41 54 0	−11 31.3	[illegible]	9 999351	+ 4 44 20
216	.	+42 39 27 d	−11 33.1	398	9.999358	− 0 54 56
217	apan	+35 39 17.0 c	−10 58.3	25	9.999507	− 9 18 58.22
218	Toronto, Canada . . .	+43 39 46.0 f	−11 34.8	110 g	9.999313	+ 5 17 34.70
219	Toronto, Canada . . .	+43 40 0.8 g	−11 34.8	116 g	[illegible]	+ 5 17 35.60
220	Toulouse, France . .	+43 36 44.0	−11 34.7	194	9.999320	− 0 5 51.23
221	Triest, Austria . . .	+45 38 35.5 h	−11 35.5	68 i	9.999280	− 0 55 5.23
222	Triest, Austria . . .	+45 38 45.4 j	−11 35.5	26 i	9.999257	− 0 55 3.0
223	Tschardjui, Turkestan .	+39 8 11.0 d	−11 20.7	188 d	[illegible]	− 4 14 17.2
224	Tschardjui, Turkestan .	+39 8 10.7 d	−11 20.7	167	9.999431	− 4 13 57.3
225	Tulse Hill, England .	+51 26 47	−11 18.6	[illegible]	9.999111	+ 0 0 27.7
226	Turin, Italy	+45 2 16.2 k	−11 35.7	618 k	9.999313	− 0 31 3
227	Turin, Italy	+45 4 8 3 c	−11 35.7	276 i	9 999288	− 0 30 47.15
228	Tuscaloosa, Ala. . . .	+33 12 36 8 c	−10 36 7	69	9.999568	+ 5 50 11 74
229	Ukiah, Cal.	+39 8 12.1 d	11 20.7	220 d	9 999435	+ 8 12 50.3
230	Upsala, Sweden . . .	+59 51 29 4 b	−10 5.2	21 b	9 998909	− 1 10 30.12
231	Urbana, Ill.	+40 6 20.2 l	−11 25 2	236 l	9.999412	+ 5 52 53.90
232	Utrecht, Netherlands .	+52 5 9 7 m	−11 15 0	12 m	9.999093	− 0 20 31 0
233	Utrecht, Netherlands .	+52 5 13	−11 15 0	23	9.999093	− 0 20 28.9
234	Venice, Italy	+45 26 10 5 c	−11 35.6	15 c	9.999261	− 0 49 22.12
235	Vienna, Austria . . .	+48 13 55 1 n	−11 31 5	240 i	9.999205	− 1 5 21.35
236	Vienna, Austria . . .	+48 12 35.5	−11 31.6	186 i	9.999202	− 1 5 31.61
237	Vienna, Austria . . .	+48 12 53 8	−11 31 6	214	9 999204	− 1 5 25.17
238	Vienna, Austria . . .	+48 12 46 7 c	−11 31.6	285	9 999209	− 1 5 10.96
239	Warsaw, Russia . . .	+52 13 4 6 c	−11 14 3	121 c	9 999097	− 1 24 7.25
240	Washington, D. C. . .	+38 55 14.0 o	−11 19.6	82 p	9.999431	+ 5 8 15.78
241	Washington, D. C. . .	+38 53 38 7 q	−11 19.4	31 r	9 999428	+ 5 8 12.15
242	Washington, D. C. . .	+38 53 17 3 s	−11 19 4	10 s	9.999427	+ 5 8 6.24
243	Washington, D. C. . .	+38 56 14 8 a	−11 19.7	. . .	9.999425	+ 5 8 0.0
244	Wellesley, Mass. . . .	+42 17 34 8	−11 32 3	61	9.999344	+ 4 45 12.7
245	Wellington, N. Z. . .	−41 17 3.8 b	+11 29 5	127 b	9.999375	−11 39 4.27
246	West Point, N. Y. . .	+41 23 22 1	−11 29.9	170	9.999375	+ 4 55 50.55
247	Wilhelmshaven, Germany	+53 31 52.1 c	−11 5.7	9 c	9.999057	− 0 32 35.06
248	Williams Bay, Wis. . .	+42 34 12.6 t	−11 33 0	320 t	9.999355	+ 5 54 13.24
249	Williamstown, Mass. .	+42 42 30	−11 33 2	213	9.999344	+ 4 52 50
250	Winchester, Mass. . .	+42 27 11	−11 32.7	30	9 999338	+ 4 44 32.4
251	Windsor, N. S. W. . .	−33 36 30 8 b	+10 40 6	16 r	9 999556	−10 3 19 9
252	hina	+31 5 48 0 c	−10 14.4	100 c	9.899619	− 8 4 44.82
253	nd .	+47 22 38 3 c	−11 33.5	469 c	9.999243	− 0 34 12.26

a
b
c
d
e
f Main dome.
g Transit pier.

h
i
j
k
l
m
n

o Center of the clock room.
p Ground floor of main buil
q Small dome.
r Barometer.
s Siderostat pier.
t 40-inch equatorial.
u Intersection of equator

Authority for— Latitude.	Authority for— Longitude.	Description.
r from Director, 1913.	*Washington Observations*, 1875.	Sayre Obs., Lehigh Univ.
. *Jour. of Sci.*, 1883.	Letter from Director, 1913.	Williston Obs., Mt. Holyoke Coll.
r from Director, 1897.	*U. S. C. and G. S. Report*, 1897.	[a] Washington University Obs.
n. Nach., Nr. 2582, 1884.	*Astron. Nach.*, Nr. 2582, 1884.	Imperial University Obs.
r from Director, 1914.	*Astron. Nach.*, Nr. 3993, 1905.	Obs. of Acad. of Sci.
r from Director, 1913.	*Monthly Notices, R. A. S.*, 1851.	Stonyhurst College Obs.
:len der Sternw., 1896.	*Astron. Nach.*, Nr. 3993, 1905.	Imperial Univ. Obs.
r from Director, 1912.	Letter from Director, 1912.	Sproul Obs., Swarthmore College.
n. Results, 1879–81.	See footnote ([b]).	Government Observatory.
r from Director, 1891.	Letter from Director, 1891.	Syracuse Univ. Obs.
r from Director, 1914.	Letter from Director, 1914.	Roe Observatory.
in del Obs., 1914.	*Annuario del Obs.*, 1902.	National Observatory.
r from Director, 1897.	Letter from Director, 1897.	Tashkent Observatory.
s. Astron., Bruxelles, 1907.	*Les Obs. Astron.*, Bruxelles, 1907.	Mr. Metcalf's Obs., before 1911.
l. dell'Osserv., 1900.	Letter from Director, 1913.	Collurania Observatory.
iles de l'Obs., 1894.	*Annales de l'Obs.*, 1894.	University Observatory.
r from Director, 1913.	Letter from Director, 1913.	University Observatory.
r from Director, 1912.	Letter from Director, 1912.	Meteorological Observatory.
iles de l'Obs., 1912.	British *Nautical Almanac.*	University Observatory.
r from Director, 1913.	Letter from Director, 1913.	[c] Imperial and Royal Maritime Obs.
, Director new Obs., 1913.	Letter, Director new Obs., 1913.	[d] Imperial and Royal MaritimeObs.
m. Nach., Nr. 4588, 1912.	Letter from Director, 1913.	International Lat. Obs., since 1909.
ootnote ([e]).	See footnote ([l]).	International Lat. Obs., before 1909.
sh *Nautical Almanac.*	British *Nautical Almanac.*	Obs. of Sir W. Huggins, London.
er from Director, 1913.	Letter from Director, 1913.	[f] Royal Obs. of the Univ., since 1913.
er from Director, 1913.	*Astron. Nach.*, Nr. 3993, 1905.	[g] Royal Obs. of the Univ., before 1913.
er from Director, 1897.	Letter from Director, 1897.	Obs. Univ. of Ala.
footnote ([e]).	Letter from Director, 1912.	International Lat. Obs.
er from Director, 1913.	*Astron. Nach.*, Nr. 3993, 1905.	University Observatory.
er from Director, 1913.	Letter from Director, 1913.	Obs., Univ. of Ill.
er from Director, 1913.	Letter from Director, 1913.	University Obs., since 1855.
r, Director new Obs., 1913.	Letter, Director new Obs., 1913.	University Obs., before 1855.
er from Director, 1913.	Letter from Director, 1913.	Obs. of the Nautical Institute.
footnote ([h]).	*Astron. Nach.*, Nr. 3993, 1905.	[i] Imperial and Royal Univ. Obs.
r, Director new Obs., 1913.	Letter, Director new Obs., 1913.	[j] Imperial and Royal Univ. Obs.
iner Jahrbuch.	*Berliner Jahrbuch.*	Oppolzer Obs., Josephstadt.
lik. der Sternw., 1892.	*Astron. Nach.*, Nr. 3993, 1905.	Kuffner Obs., Ottakring.
on. Nach., Nr. 4666, 1913.	*Astron. Nach.*, Nr. 3993, 1905.	Imperial University Obs.
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Madama.
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[i] Since 1879.
[j] Before 1879.
[k] Old observatory 9″ N., 1s.2 E.
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THE COMPUTATION OF LUNAR DISTANCES.

Tables of lunar distances are no longer given in the Ephemeris, in a ance with the decision of the Navy Department that they are now o practical use to navigators. However, in case it is desired to use this m the angular distance between the Moon and any heavenly body may l culated by solving the spherical triangle of which the known parts are th distances of the Moon and the other body and the difference of thei ascensions, or, in other words, the angle at the pole between their hour- Then, the Greenwich mean time of the observation being approximately k and the lunar distances for the star or other body calculated for the eve before and after, the required lunar distance may be interpolated a longitude derived by the methods given in books on navigation.

EXAMPLE 1.

Find the lunar distance of Aldebaran, March 5, 1917, at 10 P. M., Greenwich Mean T

Let α and δ = Right Ascension and Declination of the star
" α' and δ' = " " " " " " Moon
" D = Lunar Distance
Also let $\tan M = \tan \delta' \sec (\alpha - \alpha')$
Then $\cos D = \sin \delta' \cos (M - \delta) \operatorname{cosec} M$

$\alpha = 4^h\ 31^m\ 11^s.0$	$M = 33°\ 53'\ 48''$
$\alpha' = 8^h\ 55^m\ 24^s.6$	$\delta = +16°\ 20'\ 41''$
$\alpha - \alpha' = 19^h\ 35^m\ 46^s.4$	$M - \delta = 17°\ 33'\ 7''$
$\alpha - \alpha' = 293°\ 56'\ 36''$	$\sin \delta' = 9.420069$
$\delta' = +\ 15°\ 15'\ 8''$	$\cos (M - \delta) = 9.979295$
$\tan \delta' = 9.435642$	$\operatorname{cosec} M = 0.253602$
$\sec (\alpha - \alpha') = 0.391653$	$\cos D = 9.652966$
$\tan M = 9.827295$	$D = 63°\ 16'\ 22''$

EXAMPLE 2.

Find the lunar distance of Jupiter March 26, 1917, at noon, Greenwich Mean Time. case the distance is smaller and the following method is more accurate.

Let α and δ = Right Ascension and Declination of the planet
" α' and δ' = " " " " " " Moon
" D = Lunar Distance
Also let $\tan N = \tan \frac{1}{2} (\alpha - \alpha') \cos \frac{1}{2} (\delta + \delta') \operatorname{cosec} \frac{1}{2} (\delta - \delta')$
Then $\sin \frac{1}{2} D = \sin \frac{1}{2} (\alpha - \alpha') \cos \frac{1}{2} (\delta + \delta') \operatorname{cosec} N$
Sin N and $\sin \frac{1}{2} (\alpha - \alpha')$ have the same algebraic sign.

$\alpha = 2^h\ 23^m\ 57^s.5$	$\tan \frac{1}{2} (\alpha - \alpha') = 8.920918\ n$
$\alpha' = 3^h\ 2^m\ 4^s.6$	$\cos \frac{1}{2} (\delta + \delta') = 9.979520$
$\alpha - \alpha' = 23^h\ 21^m\ 52^s.9$	$\operatorname{cosec} \frac{1}{2} (\delta - \delta') = 1.142053\ n$
$\alpha - \alpha' = 350°\ 28'\ 14''$	$\tan N = 0.042491$
$\delta = +\ 13°\ 19'\ 23''$	$N = 47°\ 47'\ 54''$
$\delta' = +\ 21°\ 35'\ 33''$	
$\delta + \delta' = +\ 34°\ 54'\ 56''$	$\sin \frac{1}{2} (\alpha - \alpha') = 8.919414$
$\delta - \delta' = -\ 8°\ 16'\ 10''$	$\cos \frac{1}{2} (\delta + \delta') = 9.979520$
	$\operatorname{cosec} N = 0.130308$
$\frac{1}{2} (\alpha - \alpha') = 175°\ 14'\ 7''$	$\sin \frac{1}{2} D = 9.029242$
$\frac{1}{2} (\delta + \delta') = +\ 17°\ 27'\ 28''$	$\frac{1}{2} D = 6°\ 8'\ 25''$
$\frac{1}{2} (\delta - \delta') = -\ 4°\ 8'\ 5''$	$D = 12°\ 16'\ 50''$

FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS, 1917.

Reduce the observed altitude of Polaris to the true altitude.
Reduce the recorded time of observation to the local sidereal time.
Take out the apparent right ascension and declination of Polaris for the time of observation.
Subtract the apparent right ascension from the local sidereal time of observation and the ainder is the hour-angle of Polaris.
With this hour-angle as the vertical argument, and the apparent declination of Polaris as the zontal argument, take out the correction from Table I and add it to or subtract it from the altitude, according to its sign.
For other altitudes than 45°, corrections taken from the supplementary table at the bottom able I (Table Ia) may be applied when necessary for the degree of accuracy required.

Example.—1917, August 5, at $10^h\ 40^m\ 30^s$ P. M. local mean solar time, in longitude 59° west reenwich, suppose the true altitude of Polaris to be 33° 20′ 0″, required the latitude of the e.

	h	m	s
Local astronomical mean time	10	40	30
Reduction from Table III for $10^h\ 40^m\ 30^s$		+ 1	45
Greenwich sidereal time of mean noon, August 5, page 10 .	8	53	52
Reduction from Table III, for longitude ($-3^h\ 56^m$ west, or plus)		+ 0	39
	h	m	s
Sum (having regard to signs) is equal to local sidereal time .	19	36	46
R. A. of Polaris (page 281) for time of observation . . .	1	30	56
	h	m	s
Remainder is equal to hour-angle of Polaris	18	5	50
Decl. of Polaris (page 281) for time of observation, 88° 51′ 43″			
	°	′	″
True altitude	+33	20	0
Correction from Table I		−1	4
Correction from Table Ia			−14
	°	′	″
Latitude of the place	+33	18	42

Observations of Polaris for latitude should be made when practicable near the times of upper r lower culminations (hour-angle 0^h or 12^h). However, at sea, if made near elongation (hour-le 6^h or 18^h), the hour-angle, and hence the local time, should be known within one minute.

Decl. / A.	88° 51′ 40″		88° 51′ 50″		88° 52′ 0″		88° 52′ 10″		88° 52′ 20″		88° 52′ 30″		Decl. / H. A.
h m	′ ″		′ ″		′ ″		′ ″		′ ″		′ ″		h m
0 0	−68 20	0	−68 10	0	−68 0	0	−67 50	0	−67 40	0	−67 30	0	24 0
3	68 20	1	68 10	1	68 0	1	67 50	1	67 40	1	67 30	1	23 57
6	68 19	2	68 9	2	67 59	2	67 49	2	67 39	2	67 29	2	54
9	68 17	3	68 7	3	67 57	3	67 47	3	67 37	3	67 27	3	51
12	68 14	3	68 4	3	67 54	3	67 44	3	67 34	3	67 24	3	48
0 15	−68 11	4	−68 1	4	−67 51	4	−67 41	4	−67 31	4	−67 21	4	23 45
18	68 7	5	67 57	5	67 47	4	67 37	4	67 27	4	67 17	4	42
21	68 2	5	67 52	5	67 43	6	67 33	6	67 23	6	67 13	6	39
24	67 57	6	67 47	6	67 37	6	67 27	6	67 17	6	67 7	6	36
27	67 51	7	67 41	7	67 31	7	67 21	7	67 11	7	67 1	6	33
0 30	−67 44	7	−67 34	7	−67 24	7	−67 14	7	−67 4	7	−66 55	8	23 30
33	67 37	8	67 27	8	67 17	8	67 7	8	66 57	8	66 47	8	27
36	67 29	9	67 19	9	67 9	9	66 59	9	66 49	9	66 39	9	24
39	67 20	10	67 10	10	67 0	10	66 50	9	66 40	9	66 30	9	21
42	67 10	10	67 0	10	66 50	10	66 41	11	66 31	11	66 21	10	18
0 45	−67 0	11	−66 50	11	−66 40	11	−66 30	11	−66 20	11	−66 11	11	23 15
48	66 49	12	66 39	12	66 29	12	66 19	11	66 9	11	66 0	12	12
51	66 37	13	66 27	12	66 17	12	66 8	13	65 58	12	65 48	12	9
54	66 24	13	66 15	13	66 5	13	65 55	13	65 46	13	65 36	13	6
0 57	66 11	13	66 2	14	65 52	14	65 42	13	65 33	14	65 23	14	3
1 0	−65 58	15	−65 48	14	−65 38	14	−65 29	15	−65 19	14	−65 9	14	23 0
3	65 43	15	65 34	16	65 24	15	65 14	15	65 5	15	64 55	15	22 57
6	65 28	16	65 18	16	65 9	16	64 59	16	64 50	16	64 40	16	54
9	65 12	16	65 2	16	64 53	17	64 43	16	64 34	16	64 24	16	51
1 12	−64 56		−64 46		−64 36		−64 27		−64 18		−64 8		22 48

FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLAI

Decl. / H. A.	88° 51′ 40″		88° 51′ 50″		88° 52′ 0″		88° 52′ 10″		88° 52′ 20″		88° 52′ 30″	
h m	′ ″		′ ″		′ ″		′ ″		′ ″		′ ″	
1 12	−64 56	18	−64 46	17	−64 36	17	−64 27	17	−64 18	18	−64 8	17
15	64 38	18	64 29	18	64 19	17	64 10	18	64 0	17	63 51	18
18	64 20	18	64 11	19	64 2	19	63 52	18	63 43	19	63 33	18
21	64 2	20	63 52	19	63 43	19	63 34	19	63 24	19	63 15	19
24	63 42	20	63 33	20	63 24	20	63 15	20	63 5	19	62 56	20
1 27	−63 22	20	−63 13	20	−63 4	20	−62 55	21	−62 46	21	−62 36	20
30	63 2	21	62 53	21	62 44	21	62 34	21	62 25	21	62 16	21
33	62 41	22	62 32	22	62 23	22	62 13	21	62 4	22	61 55	22
36	62 19	23	62 10	23	62 1	23	61 52	23	61 42	22	61 33	22
39	61 56	23	61 47	23	61 38	23	61 29	23	61 20	23	61 11	23
1 42	−61 33	24	−61 24	24	−61 15	24	−61 6	24	−60 57	23	−60 48	23
45	61 9	24	61 0	25	60 51	24	60 42	24	60 34	25	60 25	24
48	60 45	25	60 35	25	60 27	25	60 18	25	60 9	25	60 1	25
51	60 20	26	60 10	25	60 2	25	59 53	25	59 44	25	59 36	26
54	59 54	26	59 45	26	59 37	27	59 28	26	59 19	26	59 10	26
1 57	−59 28	27	−59 19	27	−59 10	27	−59 2	27	−58 53	27	−58 44	26
2 0	59 1	28	58 52	28	58 43	27	58 35	28	58 26	27	58 18	28
3	58 33	28	58 24	28	58 16	28	58 7	28	57 59	28	57 50	28
6	58 5	29	57 56	28	57 48	29	57 39	28	57 31	29	57 22	28
9	57 36	29	57 28	30	57 19	29	57 11	29	57 2	29	56 54	29
2 12	−57 7	30	−56 58	30	−56 50	30	−56 42	30	−56 33	29	−56 25	30
15	56 37	31	56 28	30	56 20	30	56 12	31	56 4	31	55 55	30
18	56 6	31	55 58	31	55 50	31	55 41	31	55 33	31	55 25	31
21	55 35	32	55 27	32	55 19	32	55 10	31	55 2	31	54 54	31
24	55 3	32	54 55	32	54 47	32	54 39	32	54 31	32	54 23	32
2 27	−54 31	33	−54 23	33	−54 15	33	−54 7	33	−53 59	33	−53 51	33
30	53 58	34	53 50	34	53 42	33	53 34	33	53 26	33	53 18	33
33	53 24	34	53 16	34	53 9	34	53 1	34	52 53	34	52 45	33
36	52 50	34	52 42	34	52 35	34	52 27	34	52 19	34	52 12	34
39	52 16	35	52 8	35	52 1	35	51 53	35	51 45	34	51 38	35
2 42	−51 41	36	−51 33	35	−51 26	36	−51 18	35	−51 11	36	−51 3	35
45	51 5	36	50 58	36	50 50	36	50 43	36	50 35	36	50 28	36
48	50 29	37	50 22	37	50 14	36	50 7	37	49 59	36	49 52	36
51	49 52	37	49 45	37	49 38	37	49 30	37	49 23	37	49 16	37
54	49 15	38	49 8	38	49 1	38	48 53	37	48 46	37	48 39	37
2 57	−48 37	38	−48 30	38	−48 23	38	−48 16	38	−48 9	38	−48 2	38
3 0	47 59	39	47 52	39	47 45	39	47 38	38	47 31	38	47 24	38
3	47 20	39	47 13	39	47 6	39	47 0	39	46 53	39	46 46	39
6	46 41	40	46 34	39	46 27	39	46 21	40	46 14	39	46 7	39
9	46 1	40	45 55	40	45 48	40	45 41	40	45 35	40	45 28	40
3 12	−45 21	41	−45 15	41	−45 8	40	−45 1	40	−44 55	40	−44 48	40
15	44 40	41	44 34	41	44 28	41	44 21	41	44 15	41	44 8	41
18	43 59	41	43 53	41	43 47	42	43 40	41	43 34	41	43 27	41
21	43 18	42	43 12	42	43 5	42	42 59	42	42 53	42	42 46	41
24	42 36	43	42 30	43	42 23	42	42 17	42	42 11	42	42 5	42
3 27	−41 53	43	−41 47	43	−41 41	42	−41 35	42	−41 29	42	−41 23	42
30	41 10	43	41 4	43	40 59	43	40 53	43	40 47	43	40 41	43
33	40 27	43	40 21	43	40 16	44	40 10	44	40 4	43	39 58	43
36	39 44	44	39 38	44	39 32	44	39 26	44	39 21	44	39 15	44
39	39 00	45	38 54	45	38 48	44	38 42	44	38 37	44	38 31	44
3 42	−38 15	45	−38 9	45	−38 4	45	−37 58	44	−37 53	45	−37 47	44
45	37 30	45	37 24	45	37 19	45	37 14	45	37 8	45	37 3	45
48	36 45	46	36 39	45	36 34	46	36 29	46	36 23	45	36 18	45
51	35 59	46	35 54	46	35 48	45	35 43	45	35 38	45	35 33	46
54	35 13	46	35 8	46	35 3	46	34 58	46	34 53	46	34 47	45
3 57	−34 27	47	−34 22	47	−34 17	47	−34 12	47	−34 7	47	−34 2	47
4 0	33 40	47	33 35	47	33 30	47	33 25	47	33 20	46	33 15	46
3	32 53	48	32 48	48	32 43	47	32 38	47	32 34	47	32 29	47
6	32 5	48	32 0	47	31 56	48	31 51	47	31 47	48	31 42	47
4 9	−31 17		−31 13		−31 8		−31 4		−30 59		−30 55	

[F]INDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS, 1917.

88° 51′ 40″		88° 51′ 50″		88° 52′ 0″		88° 52′ 10″		88° 52′ 20″		88° 52′ 30″		Decl. / H. A.
′ ″		′ ″		′ ″		′ ″		′ ″		′ ″		h m
−31 17	48	−31 13	48	−31 8	48	−31 4	48	−30 59	47	−30 55	48	19 51
30 29	48	30 25	49	30 20	48	30 16	48	30 12	48	30 7	48	48
29 41	49	29 36	49	29 32	49	29 28	48	29 24	48	29 19	48	45
28 52	49	28 47	48	28 43	48	28 40	49	28 36	49	28 31	48	42
28 3	49	27 59	49	27 55	49	27 51	49	27 47	49	27 43	49	39
−27 14	50	−27 10	50	−27 6	49	−27 2	49	−26 58	49	−26 54	49	19 36
26 24	50	26 20	49	26 17	50	26 13	49	26 9	49	26 5	49	33
25 34	50	25 31	50	25 27	50	25 24	50	25 20	50	25 16	49	30
24 44	50	24 41	50	24 37	50	24 34	50	24 30	50	24 27	50	27
23 54	51	23 51	51	23 47	50	23 44	50	23 40	50	23 37	50	24
−23 3	51	−23 0	51	−22 57	51	−22 54	51	−22 50	50	−22 47	50	19 21
22 12	51	22 9	51	22 6	51	22 3	50	22 0	51	21 57	51	18
21 21	51	21 18	51	21 15	51	21 13	51	21 9	50	21 6	50	15
20 30	51	20 27	51	20 24	51	20 22	51	20 19	51	20 16	51	12
19 39	52	19 36	52	19 33	51	19 31	52	19 28	51	19 25	51	9
−18 47	52	−18 44	51	−18 42	52	−18 39	51	−18 37	52	−18 34	51	19 6
17 55	52	17 53	52	17 50	52	17 48	52	17 45	51	17 43	52	3
17 3	52	17 1	52	16 58	51	16 56	52	16 54	52	16 51	51	19 0
16 11	52	16 9	52	16 7	52	16 4	52	16 2	52	16 0	52	18 57
15 19	52	15 17	53	15 15	53	15 12	52	15 10	52	15 8	52	54
−14 27	53	−14 24	52	−14 22	52	−14 20	52	−14 18	52	−14 16	52	18 51
13 34	53	13 32	53	13 30	53	13 28	52	13 26	52	13 24	52	48
12 41	53	12 39	53	12 37	52	12 36	53	12 34	53	12 32	52	45
11 48	53	11 46	53	11 45	53	11 43	53	11 41	52	11 40	53	42
10 55	53	10 53	53	10 52	53	10 50	52	10 49	53	10 47	52	39
−10 2	53	−10 0	53	− 9 59	53	− 9 58	53	− 9 56	52	− 9 55	53	18 36
9 9	53	9 7	53	9 6	53	9 5	53	9 4	53	9 2	52	33
8 16	54	8 14	53	8 13	53	8 12	53	8 11	53	8 10	53	30
7 22	54	7 21	53	7 20	53	7 19	53	7 18	53	7 17	53	27
6 28	53	6 28	54	6 27	54	6 26	53	6 25	53	6 24	53	24
−5 35	54	− 5 34	53	− 5 33	53	− 5 33	53	− 5 32	53	− 5 31	53	18 21
4 41	53	4 41	53	4 40	53	4 40	54	4 39	53	4 38	53	18
3 48	54	3 48	54	3 47	54	3 46	53	3 46	53	3 45	53	15
2 54	54	2 54	54	2 53	53	2 53	53	2 53	53	2 52	53	12
2 0	53	2 0	54	2 0	54	2 0	54	2 0	54	1 59	53	9
− 1 7	54	− 1 6	53	− 1 6	53	− 1 6	53	− 1 6	53	− 1 6	53	18 6
− 0 13	54	− 0 13	54	− 0 13	53	− 0 13	53	− 0 13	53	− 0 13	53	3
+ 0 41	53	+ 0 41	53	+ 0 40	54	+ 0 40	53	+ 0 40	53	+ 0 40	53	18 0
1 34	54	1 34	54	1 34	53	1 33	54	1 33	53	1 33	53	17 57
2 28	54	2 28	53	2 27	53	2 27	53	2 26	53	2 26	53	54
+ 3 22	53	+ 3 21	54	+ 3 20	54	+ 3 20	53	+ 3 19	53	+ 3 19	53	17 51
4 15	54	4 15	53	4 14	53	4 13	53	4 12	53	4 12	52	48
5 9	53	5 8	53	5 7	53	5 6	53	5 5	53	5 4	53	45
6 2	54	6 1	53	6 0	53	5 59	53	5 58	53	5 57	53	42
6 56	53	6 54	54	6 53	53	6 52	53	6 51	53	6 50	53	39
+ 7 49	53	+ 7 48	53	+ 7 46	53	+ 7 45	53	+ 7 44	53	+ 7 43	52	17 36
8 42	53	8 41	53	8 39	53	8 38	53	8 37	52	8 35	53	33
9 35	53	9 34	53	9 32	53	9 31	52	9 29	53	9 28	52	30
10 28	53	10 27	52	10 25	53	10 23	53	10 22	52	10 20	52	27
11 21	53	11 19	53	11 18	52	11 16	52	11 14	52	11 12	53	24
+12 14	53	+12 12	53	+12 10	53	+12 8	53	+12 6	53	+12 5	52	17 21
13 7	52	13 5	52	13 3	52	13 1	52	12 59	52	12 57	51	18
13 59	53	13 57	52	13 55	52	13 53	52	13 51	51	13 48	52	15
14 52	52	14 49	52	14 47	52	14 45	52	14 42	52	14 40	52	12
15 44	52	15 41	52	15 39	52	15 37	51	15 34	52	15 32	51	9
+16 36	52	+16 33	52	+16 31	51	+16 28	52	+16 26	51	+16 23	51	17 6
17 28	51	17 25	51	17 22	52	17 20	51	17 17	51	17 14	51	3
18 19	52	18 16	52	18 14	51	18 11	51	18 8	51	18 5	51	17 0
19 11	51	19 8	51	19 5	51	19 2	51	18 59	51	18 56	51	16 57
+20 2		+19 59		+19 56		+19 53		+19 50		+19 47		16 54

FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS,

Decl. / H. A.	88° 51′ 40″		88° 51′ 50″		88° 52′ 0″		88° 52′ 10″		88° 52′ 20″		88° 52′ 30″	
h m	′ ″		′ ″		′ ″		′ ″		′ ″		′ ″	
7 6	+20 2	51	+19 59	51	+19 56	51	+19 53	51	+19 50	51	+19 47	50
9	20 53	51	20 50	51	20 47	50	20 44	50	20 41	50	20 37	51
12	21 44	51	21 41	50	21 37	51	21 34	50	21 31	50	21 28	50
15	22 35	50	22 31	50	22 28	50	22 24	50	22 21	50	22 18	49
18	23 25	50	23 21	50	23 18	50	23 14	50	23 11	50	23 7	50
7 21	+24 15	50	+24 11	50	+24 8	49	+24 4	50	+24 1	49	+23 57	49
24	25 5	50	25 1	50	24 57	50	24 54	49	24 50	49	24 46	49
27	25 55	49	25 51	49	25 47	49	25 43	49	25 39	49	25 35	49
30	26 44	49	26 40	50	26 36	49	26 32	49	26 28	49	26 24	48
33	27 33	49	27 30	48	27 25	48	27 21	48	27 17	48	27 12	49
7 36	+28 22	48	+28 18	48	+28 13	49	+28 9	48	+28 5	48	+28 1	48
39	29 10	48	29 6	48	29 2	48	28 57	48	28 53	48	28 49	47
42	29 58	48	29 54	48	29 50	47	29 45	48	29 41	47	29 36	47
45	30 46	48	30 42	47	30 37	47	30 33	47	30 28	47	30 23	47
48	31 34	47	31 29	47	31 24	47	31 20	47	31 15	47	31 10	47
7 51	+32 21	47	+32 16	47	+32 11	47	+32 7	46	+32 2	46	+31 57	46
54	33 8	47	33 3	47	32 58	46	32 53	46	32 48	46	32 43	46
7 57	33 55	46	33 50	46	33 44	46	33 39	46	33 34	46	33 29	46
8 0	34 41	46	34 36	45	34 30	46	34 25	46	34 20	46	34 15	45
3	35 27	45	35 21	46	35 16	45	35 11	45	35 6	45	35 0	45
8 6	+36 12	45	+36 7	45	+36 1	45	+35 56	45	+35 51	44	+35 45	45
9	36 57	45	36 52	44	36 46	45	36 41	44	36 35	44	36 30	44
12	37 42	44	37 36	44	37 31	44	37 25	44	37 19	44	37 14	44
15	38 26	44	38 20	44	38 15	43	38 9	44	38 3	44	37 58	43
18	39 10	44	39 4	44	38 58	44	38 53	43	38 47	43	38 41	43
8 21	+39 54	43	+39 48	43	+39 42	43	+39 36	43	+39 30	43	+39 24	43
24	40 37	43	40 31	42	40 25	42	40 19	42	40 13	42	40 7	42
27	41 20	42	41 13	42	41 7	42	41 1	42	40 55	42	40 49	42
30	42 2	42	41 55	42	41 49	42	41 43	42	41 37	41	41 31	41
33	42 44	41	42 37	42	42 31	41	42 25	41	42 18	41	42 12	41
8 36	+43 25	41	+43 19	41	+43 12	41	+43 6	41	+42 59	41	+42 53	40
39	44 6	40	44 0	40	43 53	40	43 47	40	43 40	40	43 33	40
42	44 46	40	44 40	40	44 33	40	44 27	40	44 20	40	44 13	40
45	45 26	40	45 20	39	45 13	39	45 7	39	45 0	39	44 53	39
48	46 6	39	45 59	39	45 52	39	45 46	39	45 39	39	45 32	39
8 51	+46 45	39	+46 38	39	+46 31	39	+46 25	38	+46 18	38	+46 11	38
54	47 24	38	47 17	38	47 10	38	47 3	38	46 56	38	46 49	38
8 57	48 2	38	47 55	38	47 48	37	47 41	37	47 34	37	47 27	37
9 0	48 40	37	48 33	37	48 25	37	48 18	37	48 11	37	48 4	37
3	49 17	37	49 10	36	49 2	37	48 55	36	48 48	36	48 41	36
9 6	+49 54	36	+49 46	36	+49 39	36	+49 31	36	+49 24	36	+49 17	36
9	50 30	35	50 22	36	50 15	35	50 7	36	50 0	35	49 53	35
12	51 5	35	50 58	35	50 50	35	50 43	35	50 35	35	50 28	34
15	51 40	35	51 33	34	51 25	35	51 18	34	51 10	34	51 2	35
18	52 15	34	52 7	34	52 0	34	51 52	34	51 44	34	51 37	33
9 21	+52 49	34	+52 41	34	+52 34	33	+52 26	33	+52 18	33	+52 10	33
24	53 23	33	53 15	33	53 7	33	52 59	33	52 51	33	52 43	33
27	53 56	32	53 48	32	53 40	32	53 32	32	53 24	32	53 16	32
30	54 28	32	54 20	32	54 12	32	54 4	32	53 56	32	53 48	31
33	55 0	31	54 52	31	54 44	31	54 36	31	54 28	31	54 19	31
9 36	+55 31	31	+55 23	31	+55 15	30	+55 7	30	+54 59	30	+54 50	31
39	56 2	30	55 54	30	55 45	30	55 37	30	55 29	30	55 21	30
42	56 32	30	56 24	29	56 15	30	56 7	30	55 59	29	55 51	29
45	57 2	29	56 53	29	56 45	29	56 37	29	56 28	29	56 20	29
48	57 31	28	57 22	29	57 14	28	57 6	28	56 57	28	56 49	28
9 51	+57 59	28	+57 51	28	+57 42	28	+57 34	27	+57 25	28	+57 17	27
54	58 27	27	58 19	27	58 10	27	58 1	27	57 53	27	57 44	27
9 57	58 54	27	58 46	26	58 37	27	58 28	27	58 20	26	58 11	26
10 0	*59 21*	26	59 12	26	59 4	26	58 55	26	58 46	26	58 37	26
10 3	*+59 47*		+59 38		+59 30		+59 21		+59 12		+59 3	

INDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS, 1917.

L.	88° 51′ 40″		88° 51′ 50″		88° 52′ 0″		88° 52′ 10″		88° 52′ 20″		88° 52′ 30″		Decl. / H. A.
	′ ″		′ ″		′ ″		′ ″		′ ″		′ ″		h m
	+59 47	26	+59 38	26	+59 30	25	+59 21	25	+59 12	25	+59 3	25	13 57
	60 13	24	60 4	24	59 55	25	59 46	25	59 37	25	59 28	25	54
	60 37	25	60 28	25	60 20	24	60 11	24	60 2	24	59 53	24	51
	61 2	23	60 53	23	60 44	23	60 35	23	60 26	23	60 17	23	48
	61 25	23	61 16	23	61 7	23	60 58	23	60 49	23	60 40	23	45
	+61 48	23	+61 39	23	+61 30	22	+61 21	22	+61 12	22	+61 3	22	13 42
	62 11	21	62 2	21	61 52	22	61 43	22	61 34	22	61 25	21	39
	62 32	21	62 23	21	62 14	21	62 5	21	61 56	21	61 46	21	36
	62 53	21	62 44	21	62 35	20	62 26	20	62 17	20	62 7	21	33
	63 14	20	63 5	19	62 55	20	62 46	20	62 37	20	62 28	19	30
	+63 34	19	+63 24	20	+63 15	19	+63 6	19	+62 57	19	+62 47	19	13 27
	63 53	19	63 44	18	63 34	19	63 25	18	63 16	18	63 6	18	24
	64 12	17	64 2	18	63 53	18	63 43	18	63 34	18	63 24	18	21
	64 29	18	64 20	17	64 11	17	64 1	17	63 52	17	63 42	17	18
	64 47	16	64 37	17	64 28	16	64 18	17	64 9	16	63 59	17	15
	+65 3	16	+64 54	16	+64 44	16	+64 35	16	+64 25	16	+64 16	15	13 12
	65 19	15	65 10	15	65 0	15	64 51	15	64 41	15	64 31	15	9
	65 34	15	65 25	15	65 15	15	65 6	14	64 56	15	64 46	15	6
	65 49	14	65 40	14	65 30	14	65 20	14	65 11	13	65 1	14	3
	66 3	13	65 54	13	65 44	13	65 34	13	65 24	14	65 15	13	13 0
	+66 16	13	+66 7	12	+65 57	12	+65 47	13	+65 38	12	+65 28	12	12 57
	66 29	12	66 19	12	66 9	12	66 0	12	65 50	12	65 40	12	54
	66 41	11	66 31	11	66 21	12	66 12	11	66 2	11	65 52	11	51
2	66 52	11	66 42	11	66 33	10	66 23	10	66 13	11	66 3	11	48
5	67 3	10	66 53	10	66 43	10	66 33	10	66 24	9	66 14	10	45
3	+67 13	9	+67 3	9	+66 53	9	+66 43	9	+66 33	9	+66 24	9	12 42
1	67 22	8	67 12	8	67 2	9	66 52	9	66 42	9	66 33	8	39
4	67 30	8	67 20	8	67 11	8	67 1	8	66 51	8	66 41	8	36
7	67 38	8	67 28	8	67 19	7	67 9	7	66 59	7	66 49	7	33
0	67 46	6	67 36	6	67 26	6	67 16	6	67 6	6	66 56	6	30
3	+67 52	6	+67 42	6	+67 32	6	+67 22	6	+67 12	6	+67 2	6	12 27
6	67 58	5	67 48	5	67 38	5	67 28	5	67 18	5	67 8	5	24
9	68 3	5	67 53	5	67 43	5	67 33	5	67 23	5	67 13	5	21
2	68 8	3	67 58	3	67 48	3	67 38	3	67 28	3	67 18	3	18
5	68 11	3	68 1	3	67 51	3	67 41	3	67 31	3	67 21	3	15
8	+68 14	3	+68 4	3	+67 54	3	+67 44	3	+67 34	3	+67 24	3	12 12
1	68 17	2	68 7	2	67 57	2	67 47	2	67 37	2	67 27	2	9
4	68 19	1	68 9	1	67 59	1	67 49	1	67 39	1	67 29	1	6
7	68 20	0	68 10	0	68 0	0	67 50	0	67 40	0	67 30	0	3
0	+68 20		+68 10		+68 0		+67 50		+67 40		+67 30		12 0

TABLE Ia.

able I has been computed for an altitude of 45°. For other altitudes, corrections taken he following table may be applied when the desired degree of accuracy requires it.

Altitude. / H. A.	10°	20°	30°	40°	50°	60°	70°	Altitude. / H. A.	
h	″	″	″	″	″	″	″	h	h
12	0	0	0	0	0	0	0	12	24
11	− 2	− 2	− 1	0	0	+ 2	+ 5	13	23
10	8	7	4	−2	+2	8	18	14	22
9	17	13	9	3	4	15	36	15	21
8	25	20	13	5	6	23	53	16	20
7	32	24	16	6	7	28	66	17	19
6	−34	−26	−17	−7	+8	+30	+71	18	18

39398°—1917——44

TABLE II.

INTO MEAN SOLAR TIME.

TO BE FROM A SIDEREAL TIME INTERVAL.

Sidereal.	0^h
m	m s
0	0 0.000
1	0 0 164
2	0 0.328
3	0 0.491
4	0 0.655
5	0 0.819
6	0 0.983
7	0 1.147
8	0 1.311
9	0 1.474
10	0 1.638
11	0 1.802
12	0 1.966
13	0 2.130
14	0 2.294
15	0 2.457
16	0 2.621
17	0 2.785
18	0 2.949
19	0 3 113
20	0 3.277
21	0 3.440
22	0 3.604
23	0 3.768
24	0 3.932
25	0 4.096
26	0 4 259
27	0 4.423
28	0 4 587
29	0 4 751
30	0 4.915
31	0 5 079
32	0 5.242
33	0 5 406
34	0 5.570
35	0 5.734
36	0 5 898
37	0 6 062
38	0 6 225
39	0 6 389
40	0 6 553
41	0 6 717
42	0 6.881
43	0 7 045
44	0 7 208
45	0 7.372
46	0 7 536
47	0 7.700
48	0 7.864
49	0 8.027
50	0 8 191
51	0 8 355
52	0 8 519
53	0 8 683
54	0 8 847
55	0 9.010
56	0 9 174
57	0 9 338
58	0 9.502
59	0 9.666

SIDEREAL INTO MEAN SOLAR TIME.

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.

12h	13h	14h	15h	For Seconds.	
m s	m s	m s	m s	s	s
1 57.955	2 7.784	2 17.614	2 27.443	0	0.000
1 58.119	2 7.948	2 17.778	2 27.607	1	0.003
1 58.282	2 8.112	2 17.941	2 27.771	2	0.005
1 58.446	2 8.276	2 18.105	2 27.935	3	0.008
1 58.610	2 8.440	2 18.269	2 28.099	4	0.011
1 58.774	2 8.603	2 18.433	2 28.263	5	0.014
1 58.938	2 8.767	2 18.597	2 28.426	6	0.016
1 59.101	2 8.931	2 18.761	2 28.590	7	0.019
1 59.265	2 9.095	2 18.924	2 28.754	8	0.022
1 59.429	2 9.259	2 10.088	2 28.918	9	0.025
1 59.593	2 9.423	2 19.252	2 29.082	10	0.027
1 59.757	2 9.586	2 19.416	2 29.245	11	0.030
1 59.921	2 9.750	2 19.580	2 29.409	12	0.033
2 0.084	2 9.914	2 19.744	2 29.573	13	0.035
2 0.248	2 10.078	2 19.907	2 29.737	14	0.038
2 0.412	2 10.242	2 20.071	2 29.901	15	0.041
2 0.576	2 10.405	2 20.235	2 30.065	16	0.044
2 0.740	2 10.569	2 20.399	2 30.228	17	0.046
2 0.904	2 10.733	2 20.563	2 30.392	18	0.049
2 1.067	2 10.897	2 20.727	2 30.556	19	0.052
2 1.231	2 11.061	2 20.890	2 30.720	20	0.055
2 1.395	2 11.225	2 21.054	2 30.884	21	0.057
2 1.559	2 11.388	2 21.218	2 31.048	22	0.060
2 1.723	2 11.552	2 21.382	2 31.211	23	0.063
2 1.887	2 11.716	2 21.546	2 31.375	24	[illegible]
2 2.050	2 11.880	2 21.709	2 31.539	25	0.068
2 2.214	2 12.044	2 21.873	2 31.703	26	0.071
2 2.378	2 12.208	2 22.037	2 31.867	27	0.074
2 2.542	2 12.371	2 22.201	2 32.031	28	0.076
2 2.706	2 12.535	2 22.365	2 32.194	29	0.079
2 2.869	2 12.699	2 22.529	2 32.358	30	0.082
2 3.033	2 12.863	2 22.692	2 32.522	31	0.085
2 3.197	2 13.027	2 22.856	2 32.686	32	0.087
2 3.361	2 13.191	2 23.020	2 32.850	[illegible]	0.090
2 3.525	2 13.354	2 23.184	2 33.013	34	[illegible]
2 3.689	2 13.518	2 23.348	2 33.177	35	0.096
2 3.852	2 13.682	2 23.512	2 33.341	36	0.098
2 4.016	2 13.846	2 23.675	2 33.505	37	0.101
2 4.180	2 14.010	2 23.839	2 33.669	38	0.104
2 4.344	2 14.173	2 21.003	2 33.833	39	0.106
2 4.508	2 14.337	2 24.167	2 33.996	40	0.109
2 4.672	2 14.501	2 24.331	2 34.160	41	0.112
2 4.835	2 14.665	2 24.495	2 34.324	42	0.115
2 4.999	2 14.829	2 21.658	2 34.488	43	0.117
2 5.163	2 14.993	2 24.822	2 34.652	44	0.120
2 5.327	2 15.156	2 24.986	2 34.816	45	0.123
2 5.491	2 15.320	2 25.150	2 34.979	46	0.126
2 5.655	2 15.484	2 25.314	2 35.143	47	0.128
2 5.818	2 15.648	2 25.477	2 35.307	48	0.131
2 5.982	2 15.812	2 25.641	2 35.471	[illegible]	0.134
2 6.146	2 15.976	2 25.805	2 35.635	50	0.137
2 6.310	2 16.139	2 25.969	2 35.798	51	0.139
2 6.474	2 16.303	2 26.133	2 35.962	52	0.142
2 6.637	2 16.467	2 26.297	2 36.126	53	0.145
2 6.801	2 16.631	2 26.460	2 36.290	54	0.147
2 6.965	2 16.795	2 26.624	2 36.454	55	0.150
2 7.129	2 16.959	2 26.788	2 36.618	56	0.153
2 7.293	2 17.122	2 26.952	2 36.781	57	0.156
2 7.457	2 17.286	2 27.116	2 36.945	58	0.15[illegible]
2 7.620	2 17.450	2 27.280	2 37.109	59	0.1[illegible]

TABLE II.

SIDEREAL INTO MEAN SOLAR TIME.

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.

Side-real.	16^h	17^h	18^h	19^h	20^h	21^h	22^h	23^h	Sec
m	m s	m s	m s	m s	m s	m s	m s	m s	s
0	2 37.273	2 47.102	2 56.932	3 6.762	3 16.591	3 26.421	3 36.250	3 46.080	0
1	2 37.437	2 47.266	2 57.096	3 6.925	3 16.755	3 26.585	3 36.414	3 46.244	1
2	2 37.601	2 47.430	2 57.260	3 7.089	3 16.919	3 26.748	3 36.578	3 46.407	2
3	2 37.764	2 47.594	2 57.424	3 7.253	3 17.083	3 26.912	3 36.742	3 46.571	3
4	2 37.928	2 47.758	2 57.587	3 7.417	3 17.246	3 27.076	3 36.906	3 46.735	4
5	2 38.092	2 47.922	2 57.751	3 7.581	3 17.410	3 27.240	3 37.069	3 46.899	5
6	2 38.256	2 48.085	2 57.915	3 7.745	3 17.574	3 27.404	3 37.233	3 47.063	6
7	2 38.420	2 48.249	2 58.079	3 7.908	3 17.738	3 27.568	3 37.397	3 47.227	7
8	2 38.584	2 48.413	2 58.243	3 8.072	3 17.902	3 27.731	3 37.561	3 47.390	8
9	2 38.747	2 48.577	2 58.406	3 8.236	3 18.066	3 27.895	3 37.725	3 47.554	9
10	2 38.911	2 48.741	2 58.570	3 8.400	3 18.229	3 28.059	3 37.889	3 47.718	10
11	2 39.075	2 48.905	2 58.734	3 8.564	3 18.393	3 28.223	3 38.052	3 47.882	11
12	2 39.239	2 49.068	2 58.898	3 8.728	3 18.557	3 28.387	3 38.216	3 48.046	12
13	2 39.403	2 49.232	2 59.062	3 8.891	3 18.721	3 28.550	3 38.380	3 48.210	13
14	2 39.566	2 49.396	2 59.226	3 9.055	3 18.885	3 28.714	3 38.544	3 48.373	14
15	2 39.730	2 49.560	2 59.389	3 9.219	3 19.049	3 28.878	3 38.708	3 48.537	15
16	2 39.894	2 49.724	2 59.553	3 9.383	3 19.212	3 29.042	3 38.871	3 48.701	16
17	2 40.058	2 49.888	2 59.717	3 9.547	3 19.376	3 29.206	3 39.035	3 48.865	17
18	2 40.222	2 50.051	2 59.881	3 9.710	3 19.540	3 29.370	3 39.199	3 49.029	18
19	2 40.386	2 50.215	3 0.045	3 9.874	3 19.704	3 29.533	3 39.363	3 49.193	19
20	2 40.549	2 50.379	3 0.209	3 10.038	3 19.868	3 29.697	3 39.527	3 49.356	20
21	2 40.713	2 50.543	3 0.372	3 10.202	3 20.032	3 29.861	3 39.691	3 49.520	21
22	2 40.877	2 50.707	3 0.536	3 10.366	3 20.195	3 30.025	3 39.854	3 49.684	22
23	2 41.041	2 50.870	3 0.700	3 10.530	3 20.359	3 30.189	3 40.018	3 49.848	23
24	2 41.205	2 51.034	3 0.864	3 10.693	3 20.523	3 30.353	3 40.182	3 50.012	24
25	2 41.369	2 51.198	3 1.028	3 10.857	3 20.687	3 30.516	3 40.346	3 50.175	25
26	2 41.532	2 51.362	3 1.192	3 11.021	3 20.851	3 30.680	3 40.510	3 50.339	26
27	2 41.696	2 51.526	3 1.355	3 11.185	3 21.014	3 30.844	3 40.674	3 50.503	27
28	2 41.860	2 51.690	3 1.519	3 11.349	3 21.178	3 31.008	3 40.837	3 50.667	28
29	2 42.024	2 51.853	3 1.683	3 11.513	3 21.342	3 31.172	3 41.001	3 50.831	29
30	2 42.188	2 52.017	3 1.847	3 11.676	3 21.506	3 31.336	3 41.165	3 50.995	30
31	2 42.352	2 52.181	3 2.011	3 11.840	3 21.670	3 31.499	3 41.329	3 51.158	31
32	2 42.515	2 52.345	3 2.174	3 12.004	3 21.834	3 31.663	3 41.493	3 51.322	32
33	2 42.679	2 52.509	3 2.338	3 12.168	3 21.997	3 31.827	3 41.657	3 51.486	33
34	2 42.843	2 52.673	3 2.502	3 12.332	3 22.161	3 31.991	3 41.820	3 51.650	34
35	2 43.007	2 52.836	3 2.666	3 12.496	3 22.325	3 32.155	3 41.984	3 51.814	35
36	2 43.171	2 53.000	3 2.830	3 12.659	3 22.489	3 32.318	3 42.148	3 51.978	36
37	2 43.334	2 53.164	3 2.994	3 12.823	3 22.653	3 32.482	3 42.312	3 52.141	37
38	2 43.498	2 53.328	3 3.157	3 12.987	3 22.817	3 32.646	3 42.476	3 52.305	38
39	2 43.662	2 53.492	3 3.321	3 13.151	3 22.980	3 32.810	3 42.639	3 52.469	39
40	2 43.826	2 53.656	3 3.485	3 13.315	3 23.144	3 32.974	3 42.803	3 52.633	40
41	2 43.990	2 53.819	3 3.649	3 13.478	3 23.308	3 33.138	3 42.967	3 52.797	41
42	2 44.154	2 53.983	3 3.813	3 13.642	3 23.472	3 33.301	3 43.131	3 52.961	42
43	2 44.317	2 54.147	3 3.977	3 13.806	3 23.636	3 33.465	3 43.295	3 53.124	43
44	2 44.481	2 54.311	3 4.140	3 13.970	3 23.800	3 33.629	3 43.459	3 53.288	44
45	2 44.645	2 54.475	3 4.304	3 14.134	3 23.963	3 33.793	3 43.622	3 53.452	45
46	2 44.809	2 54.638	3 4.468	3 14.298	3 24.127	3 33.957	3 43.786	3 53.616	46
47	2 44.973	2 54.802	3 4.632	3 14.461	3 24.291	3 34.121	3 43.950	3 53.780	47
48	2 45.137	2 54.966	3 4.796	3 14.625	3 24.455	3 34.284	3 44.114	3 53.943	48
49	2 45.300	2 55.130	3 4.960	3 14.789	3 24.619	3 34.448	3 44.278	3 54.107	49
50	2 45.464	2 55.294	3 5.123	3 14.953	3 24.782	3 34.612	3 44.442	3 54.271	50
51	2 45.628	2 55.458	3 5.287	3 15.117	3 24.946	3 34.776	3 44.605	3 54.435	51
52	2 45.792	2 55.621	3 5.451	3 15.281	3 25.110	3 34.940	3 44.769	3 54.599	52
53	2 45.956	2 55.785	3 5.615	3 15.444	3 25.274	3 35.104	3 44.933	3 54.763	53
54	2 46.120	2 55.949	3 5.779	3 15.608	3 25.438	3 35.267	3 45.097	3 54.926	54
55	2 46.283	2 56.113	3 5.942	3 15.772	3 25.602	3 35.431	3 45.261	3 55.090	55
56	2 46.447	2 56.277	3 6.106	3 15.936	3 25.765	3 35.595	3 45.425	3 55.254	56
57	2 46.611	2 56.441	3 6.270	3 16.100	3 25.929	3 35.759	3 45.588	3 55.418	57
58	2 46.775	2 56.604	3 6.434	3 16.264	3 26.093	3 35.923	3 45.752	3 55.582	58
59	2 46.939	2 56.768	3 6.598	3 16.427	3 26.257	3 36.086	3 45.916	3 55.746	59

MEAN SOLAR INTO SIDEREAL TIME.

TO BE ADDED TO A MEAN TIME INTERVAL.

TABLE III.

MEAN SOLAR INTO SIDEREAL TIME.

TO BE ADDED TO A MEAN TIME

MEAN SOLAR INTO SIDEREAL TIME.

TO BE ADDED TO A MEAN TIME INTERVAL.

	19h	20h	21h	22h	23h	For Seconds.	
	m s	m s	m s	m s	m s	s	s
7	3 7.273	3 17.129	3 26.986	3 36.842	3 46.699	0	0.000
1	3 7.437	3 17.294	3 27.150	3 37.007	3 46.863	1	0.003
5	3 7.602	3 17.458	3 27.315	3 37.171	3 47.027	2	0.005
9	3 7.766	3 17.622	3 27.479	3 37.335	3 47.192	3	[illegible]
4	3 7.930	3 17.787	3 27.643	3 37.500	3 47.356	4	0.011
8	3 8.094	3 17.951	3 27.807	3 37.664	3 47.520	5	0.014
2	3 8.259	3 18.115	3 27.972	3 37.828	3 47.685	6	0.016
6	3 8.423	3 18.279	3 28.136	3 37.992	3 47.849	7	0.019
1	3 8.587	3 18.444	3 28.300	3 38.157	3 48.013	8	0.022
5	3 8.751	3 18.608	3 28.464	3 38.321	3 48.177	9	0.025
0	3 8.916	3 18.772	3 28.629	3 38.485	3 48.342	10	0.027
4	3 9.080	3 18.937	3 28.793	3 38.649	3 48.506	11	0.030
8	3 9.244	3 19.101	3 28.957	3 38.814	3 48.670	12	0.033
2	3 9.409	3 19.265	3 29.122	3 38.978	3 48.834	13	0.036
6	3 9.573	3 19.429	3 29.286	3 39.142	3 48.999	14	0.038
1	3 9.737	3 19.594	3 29.450	3 39.307	3 49.163	15	0.041
5	3 9.901	3 19.758	3 29.614	3 39.471	3 49.327	16	0.044
9	3 10.066	3 19.922	3 29.779	3 39.635	3 49.492	17	0.047
3	3 10.230	3 20.086	3 29.943	3 39.799	3 49.656	18	0.049
8	3 10.394	3 20.251	3 30.107	3 39.964	3 49.820	19	0.052
2	3 10.559	3 20.415	3 30.271	3 40.128	3 49.984	20	0.055
6	3 10.723	3 20.579	3 30.436	3 40.292	3 50.149	21	0.057
1	3 10.887	3 20.744	3 30.600	3 40.456	3 50.313	22	0.060
5	3 11.051	3 20.908	3 30.764	3 40.621	3 50.477	23	[illegible]
9	3 11.216	3 21.072	3 30.929	3 40.785	3 50.642	24	0.066
3	3 11.380	3 21.236	3 31.093	3 40.949	3 50.806	25	[illegible]
8	3 11.544	3 21.401	3 31.257	3 41.114	3 50.970	26	0.071
2	3 11.708	3 21.565	3 31.421	3 41.278	3 51.134	27	0.074
6	3 11.873	3 21.729	3 31.586	3 41.442	3 51.299	28	0.077
1	3 12.037	3 21.893	3 31.750	3 41.606	3 51.463	29	0.079
5	3 12.201	3 22.058	3 31.914	3 41.771	3 51.627	30	0.082
9	3 12.366	3 22.222	3 32.078	3 41.935	3 51.791	31	[illegible]
3	3 12.530	3 22.386	3 32.243	3 42.099	3 51.956	32	0.088
8	3 12.694	3 22.551	3 32.407	3 42.264	3 52.120	33	0.090
2	3 12.858	3 22.715	3 32.571	3 42.428	3 52.284	34	0.093
6	3 13.023	3 22.879	3 32.736	3 42.592	3 52.449	35	0.096
0	3 13.187	3 23.043	3 32.900	3 42.756	3 52.613	36	0.099
5	3 13.351	3 23.208	3 33.064	3 42.921	3 52.777	37	0.101
9	3 13.515	3 23.372	3 33.228	3 43.085	3 52.941	38	0.104
3	3 13.680	3 23.536	3 33.393	3 43.249	3 53.106	39	0.107
8	3 13.844	3 23.700	3 33.557	3 43.413	3 53.270	40	0.110
2	3 14.008	3 23.865	3 33.721	3 43.578	3 53.434	41	0.112
6	3 14.173	3 24.029	3 33.886	3 43.742	3 53.598	42	0.115
0	3 14.337	3 24.193	3 34.050	3 43.906	3 53.763	43	0.118
5	3 14.501	3 24.358	3 34.214	3 44.071	3 53.927	44	0.120
9	3 14.665	3 24.522	3 34.378	3 44.235	3 54.091	45	0.123
3	3 14.830	3 24.686	3 34.543	3 44.399	3 54.256	46	0.126
7	3 14.994	3 24.850	3 34.707	3 44.563	3 54.420	47	0.129
2	3 15.158	3 25.015	3 34.871	3 44.728	3 54.584	48	0.131
6	3 15.322	3 25.179	3 35.035	3 44.892	3 54.748	49	0.134
0	3 15.487	3 25.343	3 35.200	3 45.056	3 54.913	50	0.137
5	3 15.651	3 25.508	3 35.364	3 45.220	3 55.077	51	0.140
9	3 15.815	3 25.672	3 35.528	3 45.385	3 55.241	52	0.142
3	3 15.980	3 25.836	3 35.693	3 45.549	3 55.405	53	0.145
7	3 16.144	3 26.000	3 35.857	3 45.713	3 55.570	54	0.148
2	3 16.308	3 26.165	3 36.021	3 45.878	3 55.734	55	0.151
6	3 16.472	3 26.329	3 36.185	3 46.042	3 55.898	56	0.153
[illegible]	3 16.637	3 26.493	3 36.350	3 46.206	3 56.063	57	0.156
[illegible]	3 16.801	3 26.657	3 36.514	3 46.370	3 56.227	58	0.15
[illegible]	3 16.965	3 26.822	3 36.678	3 46.535	3 56.391	59	0.1

AZIMUTH OF POLARIS AT ALL HOUR ANGLES, 1917.

[For hour angles 0^h to 12^h the star is west of north, and for hour angles 12^h to 24^h it is east

H. A. \ Lat.	10°	15°	20°	22°	24°	26°	28°	30°	32°
h m	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
0 0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
10	0 3.0	0 3.1	0 3.2	0 3.2	0 3.3	0 3.3	0 3.4	0 3.5	0 3.5
20	0 6.0	0 6.2	0 6.3	0 6.4	0 6.5	0 6.6	0 6.8	0 6.9	0 7.1
0 30	0 9.0	0 9.2	0 9.5	0 9.6	0 9.8	0 10.0	0 10.1	0 10.3	0 10.6
40	0 12.0	0 12.3	0 12.6	0 12.8	0 13.0	0 13.2	0 13.5	0 13.8	0 14.1
50	0 15.0	0 15.3	0 15.7	0 16.0	0 16.2	0 16.5	0 16.8	0 17.2	0 17.5
1 0	0 17.9	0 18.3	0 18.8	0 19.1	0 19.4	0 19.7	0 20.1	0 20.5	0 21.0
10	0 20.8	0 21.3	0 21.9	0 22.2	0 22.5	0 22.9	0 23.4	0 23.8	0 24.4
20	0 23.7	0 24.2	0 24.9	0 25.2	0 25.6	0 26.1	0 26.6	0 27.1	0 27.7
1 30	0 26.5	0 27.0	0 27.8	0 28.2	0 28.7	0 29.2	0 29.7	0 30.3	0 31.0
40	0 29.2	0 29.9	0 30.7	0 31.2	0 31.7	0 32.2	0 32.8	0 33.5	0 34.2
50	0 31.9	0 32.6	0 33.6	0 34.1	0 34.6	0 35.2	0 35.8	0 36.6	0 37.4
2 0	0 34.6	0 35.3	0 36.4	0 36.9	0 37.5	0 38.1	0 38.8	0 39.6	0 40.5
10	0 37.2	0 37.9	0 39.1	0 39.6	0 40.2	0 40.9	0 41.7	0 42.5	0 43.5
20	0 39.7	0 40.5	0 41.7	0 42.3	0 42.9	0 43.7	0 44.5	0 45.4	0 46.4
2 30	0 42.1	0 43.0	0 44.2	0 44.9	0 45.6	0 46.4	0 47.2	0 48.2	0 49.2
40	0 44.5	0 45.4	0 46.7	0 47.4	0 48.1	0 48.9	0 49.8	0 50.8	0 52.0
50	0 46.7	0 47.7	0 49.1	0 49.8	0 50.6	0 51.4	0 52.4	0 53.4	0 54.6
3 0	0 48.9	0 49.9	0 51.4	0 52.1	0 52.9	0 53.8	0 54.8	0 55.9	0 57.1
10	0 51.0	0 52.0	0 53.6	0 54.3	0 55.2	0 56.1	0 57.1	0 58.3	0 59.5
20	0 52.9	0 54.0	0 55.6	0 56.4	0 57.3	0 58.2	0 59.3	1 0.5	1 1.8
3 30	0 54.8	0 56.0	0 57.6	0 58.4	0 59.3	1 0.3	1 1.4	1 2.7	1 4.0
40	0 56.6	0 57.8	0 59.5	1 0.3	1 1.2	1 2.2	1 3.4	1 4.7	1 6.1
50	0 58.3	0 59.5	1 1.2	1 2.1	1 3.0	1 4.1	1 5.2	1 6.6	1 8.0
4 0	0 59.8	1 1.1	1 2.8	1 3.7	1 4.7	1 5.8	1 7.0	1 8.3	1 9.8
10	1 1.3	1 2.5	1 4.3	1 5.2	1 6.2	1 7.3	1 8.6	1 9.9	1 11.4
20	1 2.6	1 3.9	1 5.7	1 6.6	1 7.6	1 8.8	1 10.0	1 11.4	1 13.0
4 30	1 3.8	1 5.1	1 7.0	1 7.9	1 8.9	1 10.1	1 11.4	1 12.8	1 14.3
40	1 4.9	1 6.2	1 8.1	1 9.0	1 10.1	1 11.2	1 12.5	1 14.0	1 15.6
50	1 5.8	1 7.2	1 9.1	1 10.0	1 11.1	1 12.3	1 13.6	1 15.1	1 16.7
5 0	1 6.7	1 8.0	1 9.9	1 10.9	1 12.0	1 13.2	1 14.5	1 16.0	1 17.6
10	1 7.4	1 8.7	1 10.7	1 11.6	1 12.7	1 13.9	1 15.3	1 16.8	1 18.4
20	1 8.0	1 9.3	1 11.3	1 12.2	1 13.3	1 14.5	1 15.9	1 17.4	1 19.0
5 30	1 8.4	1 9.8	1 11.7	1 12.7	1 13.8	1 15.0	1 16.4	1 17.9	1 19.5
40	1 8.7	1 10.1	1 12.0	1 13.0	1 14.1	1 15.3	1 16.7	1 18.2	1 19.9
50	1 8.9	1 10.3	1 12.2	1 13.2	1 14.3	1 15.5	1 16.9	1 18.4	1 20.1
6 0	1 9.0	1 10.3	1 12.3	1 13.2	1 14.3	1 15.6	1 16.9	1 18.4	1 20.1
10	1 8.9	1 10.2	1 12.2	1 13.2	1 14.2	1 15.5	1 16.8	1 18.3	1 20.0
20	1 8.7	1 10.0	1 12.0	1 12.9	1 14.0	1 15.2	1 16.6	1 18.0	1 19.7
6 30	1 8.3	1 9.7	1 11.6	1 12.5	1 13.6	1 14.8	1 16.2	1 17.6	1 19.3
40	1 7.9	1 9.2	1 11.1	1 12.0	1 13.1	1 14.3	1 15.6	1 17.1	1 18.7
50	1 7.3	1 8.6	1 10.5	1 11.4	1 12.4	1 13.6	1 14.9	1 16.4	1 18.0
7 0	1 6.6	1 7.8	1 9.7	1 10.6	1 11.6	1 12.8	1 14.1	1 15.5	1 17.1
10	1 5.7	1 6.9	1 8.8	1 9.7	1 10.7	1 11.9	1 13.1	1 14.5	1 16.1
20	1 4.7	1 5.9	1 7.8	1 8.6	1 9.6	1 10.8	1 12.0	1 13.4	1 14.9
7 30	1 3.6	1 4.8	1 6.6	1 7.5	1 8.4	1 9.6	1 10.8	1 12.1	1 13.6
40	1 2.4	1 3.6	1 5.3	1 6.2	1 7.1	1 8.2	1 9.4	1 10.7	1 12.2
50	1 1.1	1 2.2	1 3.9	1 4.7	1 5.7	1 6.7	1 7.9	1 9.2	1 10.6
8 0	0 59.6	1 0.7	1 2.4	1 3.2	1 4.1	1 5.1	1 6.3	1 7.5	1 8.9
10	0 58.1	0 59.1	1 0.7	1 1.5	1 2.4	1 3.4	1 4.5	1 5.7	1 7.1
20	0 56.4	0 57.4	0 59.0	0 59.7	1 0.6	1 1.6	1 2.6	1 3.8	1 5.1
8 30	0 54.6	0 55.6	0 57.1	0 57.8	0 58.7	0 59.6	1 0.6	1 1.8	1 3.1
40	0 52.7	0 53.7	0 55.1	0 55.8	0 56.6	0 57.5	0 58.5	0 59.6	1 0.9
50	0 50.7	0 51.6	0 53.0	0 53.7	0 54.5	0 55.4	0 56.3	0 57.4	0 58.6
9 0	*0 48.6*	0 49.5	0 50.8	0 51.5	0 52.2	0 53.1	0 54.0	0 55.0	0 56.1

AZIMUTH OF POLARIS AT ALL HOUR ANGLES, 1917.

hour angles 0^h to 12^h the star is west of north, and for hour angles 12^h to 24^h it is east of north.]

Lat. / H.A.	10°	15°	20°	22°	24°	26°	28°	30°	32°	Lat. / H.A.
h m	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	h m
9 0	0 48.6	0 49.5	0 50.8	0 51.5	0 52.2	0 53.1	0 54.0	0 55.0	0 56.1	15 0
10	0 46.5	0 47.3	0 48.6	0 49.2	0 49.9	0 50.7	0 51.6	0 52.5	0 53.6	14 50
20	0 44.2	0 45.0	0 46.2	0 46.8	0 47.5	0 48.2	0 49.0	0 50.0	0 51.0	40
9 30	0 41.9	0 42.6	0 43.7	0 44.3	0 44.9	0 45.6	0 46.4	0 47.3	0 48.3	14 30
40	0 39.5	0 40.2	0 41.2	0 41.7	0 42.3	0 43.0	0 43.7	0 44.6	0 45.5	20
50	0 37.0	0 37.6	0 38.6	0 39.1	0 39.6	0 40.3	0 41.0	0 41.7	0 42.6	10
10 0	0 34.4	0 35.0	0 35.9	0 36.4	0 36.9	0 37.5	0 38.1	0 38.8	0 39.6	14 0
10	0 31.8	0 32.3	0 33.1	0 33.6	0 34.1	0 34.6	0 35.2	0 35.8	0 36.6	13 50
20	0 29.1	0 29.6	0 30.3	0 30.7	0 31.2	0 31.7	0 32.2	0 32.8	0 33.5	40
10 30	0 26.3	0 26.8	0 27.5	0 27.8	0 28.2	0 28.7	0 29.2	0 29.7	0 30.3	13 30
40	0 23.5	0 23.9	0 24.6	0 24.9	0 25.2	0 25.6	0 26.0	0 26.5	0 27.1	20
50	0 20.7	0 21.0	0 21.6	0 21.9	0 22.2	0 22.5	0 22.9	0 23.3	0 23.8	10
11 0	0 17.8	0 18.1	0 18.6	0 18.8	0 19.1	0 19.4	0 19.7	0 20.1	0 20.5	13 0
10	0 14.9	0 15.1	0 15.5	0 15.7	0 16.0	0 16.2	0 16.5	0 16.8	0 17.1	12 50
20	0 11.9	0 12.1	0 12.5	0 12.6	0 12.8	0 13.0	0 13.2	0 13.5	0 13.7	40
11 30	0 9.0	0 9.1	0 9.4	0 9.5	0 9.6	0 9.8	0 9.9	0 10.1	0 10.3	12 30
40	0 6.0	0 6.1	0 6.2	0 6.3	0 6.4	0 6.5	0 6.6	0 6.8	0 6.9	20
50	0 3.0	0 3.0	0 3.1	0 3.2	0 3.2	0 3.3	0 3.3	0 3.4	0 3.5	10
12 0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	12 0

Lat. / H.A.	82°	34°	36°	38°	40°	42°	44°	46°	48°	Lat. / H.A.
h m	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	h m
0 0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	24 0
10	0 3.5	0 3.6	0 3.7	0 3.8	0 3.9	0 4.1	0 4.2	0 4.4	0 4.5	23 50
20	0 7.1	0 7.2	0 7.4	0 7.6	0 7.8	0 8.1	0 8.4	0 8.7	0 9.0	40
0 30	0 10.6	0 10.8	0 11.1	0 11.4	0 11.8	0 12.1	0 12.6	0 13.0	0 13.5	23 30
40	0 14.1	0 14.4	0 14.8	0 15.2	0 15.7	0 16.1	0 16.7	0 17.3	0 18.0	20
50	0 17.5	0 18.0	0 18.4	0 18.9	0 19.5	0 20.1	0 20.8	0 21.6	0 22.4	10
1 0	0 21.0	0 21.5	0 22.0	0 22.6	0 23.3	0 24.1	0 24.9	0 25.8	0 26.8	23 0
10	0 24.4	0 24.9	0 25.6	0 26.3	0 27.1	0 28.0	0 28.9	0 30.0	0 31.2	22 50
20	0 27.7	0 28.4	0 29.1	0 29.9	0 30.8	0 31.8	0 32.9	0 34.1	0 35.4	40
1 30	0 31.0	0 31.7	0 32.5	0 33.4	0 34.4	0 35.6	0 36.8	0 38.1	0 39.6	22 30
40	0 34.2	0 35.0	0 35.9	0 36.9	0 38.0	0 39.3	0 40.6	0 42.1	0 43.8	20
50	0 37.4	0 38.3	0 39.3	0 40.3	0 41.5	0 42.9	0 44.3	0 46.0	0 47.8	10
2 0	0 40.5	0 41.4	0 42.5	0 43.7	0 45.0	0 46.4	0 48.0	0 49.8	0 51.7	22 0
10	0 43.5	0 44.5	0 45.6	0 46.9	0 48.3	0 49.8	0 51.5	0 53.4	0 55.5	21 50
20	0 46.4	0 47.5	0 48.7	0 50.1	0 51.6	0 53.2	0 55.0	0 57.0	0 59.3	40
2 30	0 49.2	0 50.4	0 51.7	0 53.1	0 54.7	0 56.4	0 58.3	1 0.5	1 2.9	21 30
40	0 52.0	0 53.2	0 54.6	0 56.0	0 57.7	0 59.6	1 1.6	1 3.8	1 6.3	20
50	0 54.6	0 55.9	0 57.3	0 58.9	1 0.6	1 2.6	1 4.7	1 7.0	1 9.7	10
3 0	0 57.1	0 58.5	1 0.0	1 1.6	1 3.4	1 5.4	1 7.7	1 10.1	1 12.9	21 0
10	0 59.5	1 0.9	1 2.5	1 4.2	1 6.1	1 8.2	1 10.5	1 13.1	1 15.9	20 50
20	1 1.8	1 3.3	1 4.9	1 6.7	1 8.6	1 10.8	1 13.2	1 15.9	1 18.8	40
3 30	1 4.0	1 5.5	1 7.2	1 9.0	1 11.0	1 13.3	1 15.8	1 18.5	1 21.6	20 30
40	1 6.1	1 7.6	1 9.3	1 11.2	1 13.3	1 15.6	1 18.2	1 21.0	1 24.2	20
50	1 8.0	1 9.6	1 11.4	1 13.3	1 15.4	1 17.8	1 20.4	1 23.4	1 26.6	10
4 0	1 9.8	1 11.4	1 13.2	1 15.2	1 17.4	1 19.8	1 22.5	1 25.5	1 28.9	20 0
10	1 11.4	1 13.1	1 15.0	1 17.0	1 19.2	1 21.7	1 24.5	1 27.5	1 31.0	19 50
20	1 13.0	1 14.7	1 16.6	1 18.6	1 20.9	1 23.4	1 26.3	1 29.4	1 32.9	40
4 30	1 14.3	1 16.1	1 18.0	1 20.1	1 22.4	1 25.0	1 27.9	1 31.0	1 34.6	19 30
40	1 15.6	1 17.3	1 19.3	1 21.4	1 23.8	1 26.4	1 29.3	1 32.5	1 36.1	20
50	1 16.7	1 18.4	1 20.4	1 22.6	1 25.0	1 27.6	1 30.6	1 33.8	1 37.4	10
5 0	1 17.6	1 19.4	1 21.4	1 23.6	1 26.0	1 28.7	1 31.7	1 34.9	1 38.6	19 0

TABLE IV.

AZIMUTH OF POLARIS AT ALL HOUR ANGLES, 1917.

[For hour angles 0^h to 12^h the star is west of north, and for hour angles 12^h to 24^h it is east

H.A. \ Lat.	32°	34°	36°	38°	40°	42°	44°	46°	48°
h m	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
5 0	1 17.6	1 19.4	1 21.4	1 23.6	1 26.0	1 28.7	1 31.7	1 34.9	1 38.6
10	1 18.4	1 20.2	1 22.2	1 24.4	1 26.9	1 29.6	1 32.6	1 35.9	1 39.6
20	1 19.0	1 20.9	1 22.9	1 25.1	1 27.6	1 30.3	1 33.3	1 36.6	1 40.3
5 30	1 19.5	1 21.4	1 23.4	1 25.6	1 28.1	1 30.8	1 33.8	1 37.2	1 40.9
40	1 19.9	1 21.7	1 23.7	1 26.0	1 28.5	1 31.2	1 34.2	1 37.6	1 41.3
50	1 20.1	1 21.9	1 23.9	1 26.2	1 28.6	1 31.4	1 34.4	1 37.8	1 41.5
6 0	1 20.1	1 21.9	1 24.0	1 26.2	1 28.7	1 31.4	1 34.4	1 37.8	1 41.5
10	1 20.0	1 21.8	1 23.8	1 26.0	1 28.5	1 31.2	1 34.2	1 37.6	1 41.3
20	1 19.7	1 21.5	1 23.5	1 25.7	1 28.2	1 30.9	1 33.9	1 37.2	1 40.9
6 30	1 19.3	1 21.1	1 23.1	1 25.3	1 27.7	1 30.4	1 33.4	1 36.7	1 40.3
40	1 18.7	1 20.5	1 22.5	1 24.7	1 27.1	1 29.7	1 32.7	1 35.9	1 39.6
50	1 18.0	1 19.8	1 21.7	1 23.9	1 26.2	1 28.9	1 31.8	1 35.0	1 38.6
7 0	1 17.1	1 18.9	1 20.8	1 22.9	1 25.3	1 27.9	1 30.7	1 33.9	1 37.5
10	1 16.1	1 17.8	1 19.7	1 21.8	1 24.1	1 26.7	1 29.5	1 32.7	1 36.2
20	1 14.9	1 16.6	1 18.5	1 20.6	1 22.8	1 25.4	1 28.1	1 31.2	1 34.7
7 30	1 13.6	1 15.3	1 17.1	1 19.1	1 21.4	1 23.9	1 26.6	1 29.6	1 33.0
40	1 12.2	1 13.8	1 15.6	1 17.6	1 19.8	1 22.2	1 24.9	1 27.8	1 31.1
50	1 10.6	1 12.2	1 14.0	1 15.9	1 18.0	1 20.4	1 23.0	1 25.9	1 29.1
8 0	1 8.9	1 10.5	1 12.2	1 14.1	1 16.1	1 18.4	1 21.0	1 23.8	1 26.9
10	1 7.1	1 8.6	1 10.3	1 12.1	1 14.1	1 16.3	1 18.8	1 21.6	1 24.6
20	1 5.1	1 6.6	1 8.2	1 10.0	1 11.9	1 14.1	1 16.5	1 19.2	1 22.1
8 30	1 3.1	1 4.5	1 6.0	1 7.7	1 9.6	1 11.7	1 14.0	1 16.6	1 19.4
40	1 0.9	1 2.2	1 3.7	1 5.4	1 7.2	1 9.2	1 11.4	1 13.9	1 16.7
50	0 58.6	0 59.9	1 1.3	1 2.9	1 4.6	1 6.6	1 8.7	1 11.1	1 13.7
9 0	0 56.1	0 57.4	0 58.8	1 0.3	1 2.0	1 3.8	1 5.9	1 8.1	1 10.7
10	0 53.6	0 54.8	0 56.1	0 57.6	0 59.2	1 0.9	1 2.9	1 5.1	1 7.5
20	0 51.0	0 52.1	0 53.4	0 54.7	0 56.3	0 57.9	0 59.8	1 1.8	1 4.1
9 30	0 48.3	0 49.3	0 50.5	0 51.8	0 53.3	0 54.8	0 56.6	0 58.5	1 0.7
40	0 45.5	0 46.5	0 47.6	0 48.8	0 50.2	0 51.7	0 53.3	0 55.1	0 57.2
50	0 42.6	0 43.5	0 44.6	0 45.7	0 47.0	0 48.4	0 49.9	0 51.6	0 53.5
10 0	0 39.6	0 40.5	0 41.5	0 42.5	0 43.7	0 45.0	0 46.4	0 48.0	0 49.8
10	0 36.6	0 37.4	0 38.3	0 39.2	0 40.3	0 41.5	0 42.9	0 44.3	0 46.0
20	0 33.5	0 34.2	0 35.0	0 35.9	0 36.9	0 38.0	0 39.2	0 40.6	0 42.1
10 30	0 30.3	0 31.0	0 31.7	0 32.5	0 33.4	0 34.4	0 35.5	0 36.7	0 38.1
40	0 27.1	0 27.7	0 28.3	0 29.0	0 29.9	0 30.7	0 31.7	0 32.8	0 34.0
50	0 23.8	0 24.3	0 24.9	0 25.5	0 26.3	0 27.0	0 27.9	0 28.8	0 29.9
11 0	0 20.5	0 20.9	0 21.4	0 22.0	0 22.6	0 23.3	0 24.0	0 24.8	0 25.7
10	0 17.1	0 17.5	0 17.9	0 18.4	0 18.9	0 19.4	0 20.1	0 20.7	0 21.5
20	0 13.7	0 14.0	0 14.4	0 14.7	0 15.1	0 15.6	0 16.1	0 16.6	0 17.2
11 30	0 10.3	0 10.5	0 10.8	0 11.1	0 11.4	0 11.7	0 12.1	0 12.5	0 13.0
40	0 6.9	0 7.0	0 7.2	0 7.4	0 7.6	0 7.8	0 8.1	0 8.3	0 8.6
50	0 3.5	0 3.5	0 3.6	0 3.7	0 3.8	0 3.9	0 4.0	0 4.2	0 4.3
12 0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0

H.A. \ Lat.	48°	50°	52°	54°	56°	58°	60°	61°	62°
h m	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
0 0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
10	0 4.5	0 4.7	0 4.9	0 5.2	0 5.5	0 5.8	0 6.1	0 6.3	0 6.6
20	0 9.0	0 9.4	0 9.8	0 10.3	0 10.9	0 11.5	0 12.3	0 12.7	0 13.1
0 30	0 13.5	0 14.1	0 14.8	0 15.5	0 16.3	0 17.3	0 18.4	0 19.0	0 19.6
40	0 18.0	0 18.8	0 19.6	0 20.6	0 21.7	0 23.0	0 24.4	0 25.2	0 26.1
50	0 22.4	0 23.4	0 24.5	0 25.7	0 27.0	0 28.6	0 30.4	0 31.4	0 32.5
1 0	0 26.8	0 28.0	0 29.3	0 30.7	0 32.3	0 34.2	0 36.4	0 37.8	0 38.8

AZIMUTH OF POLARIS AT ALL HOUR ANGLES, 1917.

ıgles 0^h to 12^h the star is west of north, and for hour angles 12^h to 24^h it is east of north.]

48°	50°	52°	54°	56°	58°	60°	61°	62°	Lat. / H. A.
° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	h m
0 26.8	0 28.0	0 29.3	0 30.7	0 32.3	0 34.2	0 36.4	0 37.6	0 38.8	23 0
0 31.2	0 32.5	0 34.0	0 35.6	0 37.5	0 39.7	0 42.2	0 43.6	0 45.1	22 50
0 35.4	0 36.9	0 38.6	0 40.5	0 42.7	0 45.1	0 48.0	0 49.6	0 51.3	40
0 39.6	0 41.3	0 43.2	0 45.3	0 47.7	0 50.5	0 53.7	0 55.4	0 57.3	22 30
0 43.8	0 45.6	0 47.7	0 50.0	0 52.7	0 55.7	0 59.3	1 1.2	1 3.3	20
0 47.8	0 49.8	0 52.1	0 54.6	0 57.5	1 0.8	1 4.7	1 6.8	1 9.1	10
0 51.7	0 53.9	0 56.4	0 59.1	1 2.3	1 5.8	1 10.0	1 12.3	1 14.7	22 0
0 55.5	0 57.9	1 0.5	1 3.5	1 6.9	1 10.7	1 15.1	1 17.6	1 20.2	21 50
0 59.3	1 1.8	1 4.6	1 7.7	1 11.3	1 15.4	1 20.1	1 22.8	1 25.6	40
1 2.9	1 5.5	1 8.5	1 11.9	1 15.7	1 20.0	1 25.0	1 27.8	1 30.7	21 30
1 6.3	1 9.1	1 12.3	1 15.8	1 19.8	1 24.4	1 29.7	1 32.6	1 35.7	20
1 9.7	1 12.6	1 15.9	1 19.6	1 23.8	1 28.6	1 34.1	1 37.2	1 40.5	10
1 12.9	1 16.0	1 19.4	1 23.3	1 27.7	1 32.7	1 38.4	1 41.6	1 45.0	21 0
1 15.9	1 19.1	1 22.7	1 26.8	1 31.3	1 36.5	1 42.5	1 45.8	1 49.4	20 50
1 18.8	1 22.2	1 25.9	1 30.1	1 34.8	1 40.2	1 46.4	1 49.8	1 53.5	40
1 21.6	1 25.0	1 28.9	1 33.2	1 38.1	1 43.6	1 50.0	1 53.6	1 57.4	20 30
1 24.2	1 27.7	1 31.7	1 36.1	1 41.2	1 46.9	1 53.5	1 57.1	2 1.0	20
1 26.6	1 30.2	1 34.3	1 38.9	1 44.0	1 49.9	1 56.7	2 0.4	2 4.5	10
1 28.9	1 32.6	1 36.7	1 41.4	1 46.7	1 52.7	1 59.7	2 3.5	2 7.6	20 0
1 31.0	1 34.7	1 39.0	1 43.8	1 49.2	1 55.3	2 2.4	2 6.3	2 10.5	19 50
1 32.9	1 36.7	1 41.0	1 45.9	1 51.4	1 57.7	2 4.9	2 8.9	2 13.2	40
1 34.6	1 38.5	1 42.9	1 47.9	1 53.5	1 59.8	2 7.1	2 11.2	2 15.5	19 30
1 36.1	1 40.1	1 44.6	1 49.6	1 55.3	2 1.7	2 9.1	2 13.2	2 17.6	20
1 37.4	1 41.5	1 46.0	1 51.1	1 56.9	2 3.4	2 10.9	2 15.0	2 19.5	10
1 38.6	1 42.7	1 47.3	1 52.4	1 58.2	2 4.8	2 12.3	2 16.5	2 21.0	19 0
1 39.6	1 43.7	1 48.3	1 53.5	1 59.3	2 6.0	2 13.6	2 17.8	2 22.3	18 50
1 40.3	1 44.5	1 49.1	1 54.3	2 0.2	2 6.9	2 14.5	2 18.8	2 23.3	40
1 40.9	1 45.1	1 49.7	1 55.0	2 0.9	2 7.6	2 15.2	2 19.5	2 24.1	18 30
1 41.3	1 45.5	1 50.1	1 55.4	2 1.3	2 8.0	2 15.7	2 19.9	2 24.5	20
1 41.5	1 45.7	1 50.3	1 55.6	2 1.5	2 8.2	2 15.9	2 20.1	2 24.7	10
1 41.5	1 45.7	1 50.3	1 55.6	2 1.5	2 8.2	2 15.8	2 20.0	2 24.6	18 0
1 41.3	1 45.4	1 50.1	1 55.3	2 1.2	2 7.9	2 15.5	2 19.7	2 24.2	17 50
1 40.9	1 45.0	1 49.6	1 54.8	2 0.7	2 7.3	2 14.9	2 19.1	2 23.6	40
1 40.3	1 44.4	1 49.0	1 54.2	2 0.0	2 6.5	2 14.0	2 18.2	2 22.7	17 30
1 39.6	1 43.6	1 48.2	1 53.3	1 59.0	2 5.5	2 12.9	2 17.0	2 21.5	20
1 38.6	1 42.6	1 47.1	1 52.1	1 57.8	2 4.3	2 11.6	2 15.6	2 20.0	10
1 37.5	1 41.4	1 45.9	1 50.8	1 56.4	2 2.8	2 10.0	2 14.0	2 18.3	17 0
1 36.2	1 40.0	1 44.4	1 49.3	1 54.8	2 1.1	2 8.2	2 12.1	2 16.4	16 50
1 34.7	1 38.5	1 42.8	1 47.6	1 53.0	1 59.1	2 6.1	2 10.0	2 14.2	40
1 33.0	1 36.7	1 40.9	1 45.6	1 51.0	1 57.0	2 3.8	2 7.6	2 11.7	16 30
1 31.1	1 34.8	1 38.9	1 43.5	1 48.7	1 54.6	2 1.3	2 5.0	2 9.0	20
1 29.1	1 32.7	1 36.7	1 41.2	1 46.3	1 52.0	1 58.6	2 2.2	2 6.1	10
1 26.9	1 30.4	1 34.3	1 38.7	1 43.6	1 49.2	1 55.6	1 59.2	2 3.0	16 0
1 24.6	1 28.0	1 31.8	1 36.0	1 40.8	1 46.3	1 52.5	1 55.9	1 59.6	15 50
1 22.1	1 25.4	1 29.1	1 33.2	1 37.8	1 43.1	1 49.1	1 52.4	1 56.0	40
1 19.4	1 22.6	1 26.2	1 30.2	1 34.6	1 39.7	1 45.5	1 48.7	1 52.2	15 30
1 16.7	1 19.7	1 23.1	1 27.0	1 31.3	1 36.2	1 41.8	1 44.9	1 48.2	20
1 13.7	1 16.7	1 19.9	1 23.6	1 27.8	1 32.5	1 37.9	1 40.8	1 44.0	10
1 10.7	1 13.5	1 16.6	1 20.1	1 24.1	1 28.6	1 33.8	1 36.6	1 39.7	15 0
1 7.5	1 10.2	1 13.1	1 16.5	1 20.3	1 24.6	1 29.5	1 32.2	1 35.1	14 50
1 4.1	1 6.7	1 9.5	1 12.7	1 16.3	1 20.4	1 25.1	1 27.6	1 30.4	40
1 0.7	1 3.1	1 5.8	1 8.8	1 12.2	1 16.1	1 20.5	1 22.9	1 25.5	14 30
0 57.2	0 59.4	1 2.0	1 4.8	1 8.0	1 11.6	1 15.8	1 18.1	1 20.5	20
0 53.5	0 55.6	0 58.0	1 0.7	1 3.6	1 7.0	1 10.9	1 13.1	1 15.4	10
0 49.8	0 51.8	0 53.9	0 56.4	0 59.2	1 2.3	1 6.0	1 8.0	1 10.1	14 0

AZIMUTH OF POLARIS AT ALL HOUR ANGLES, 1917.

ıngles 0^h to 12^h the star is west of north, and for hour angles 12^h to 24^h it is east of north.]

62°	63°	64°	65°	66°	67°	68°	69°	70°	Lat. / H. A.
° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	h m
2 24.6	2 29.5	2 34.8	2 40.6	2 46.9	2 53.7	3 1.2	3 9.4	3 18.4	18 0
2 24.2	2 29.1	2 34.4	2 40.2	2 46.4	2 53.2	3 0.6	3 8.7	3 17.7	17 50
2 23.6	2 28.5	2 33.7	2 39.4	2 45.6	2 52.3	2 59.7	3 7.8	3 16.7	40
2 22.7	2 27.5	2 32.7	2 38.4	2 44.5	2 51.2	2 58.5	3 6.5	3 15.3	17 30
2 21.5	2 26.3	2 31.4	2 37.0	2 43.1	2 49.7	2 56.9	3 4.8	3 13.5	20
2 20.0	2 24.8	2 29.9	2 35.4	2 41.4	2 47.9	2 55.0	3 2.8	3 11.4	10
2 18.3	2 23.0	2 28.0	2 33.5	2 39.4	2 45.8	2 52.8	3 0.5	3 9.0	17 0
2 16.4	2 21.0	2 25.9	2 31.3	2 37.1	2 43.4	2 50.3	2 57.8	3 6.2	16 50
2 14.2	2 18.7	2 23.5	2 28.8	2 34.5	2 40.7	2 47.4	2 54.9	3 3.0	40
2 11.7	2 16.1	2 20.9	2 26.0	2 31.6	2 37.7	2 44.3	2 51.6	2 59.6	16 30
2 9.0	2 13.3	2 18.0	2 23.0	2 28.5	2 34.4	2 40.9	2 48.0	2 55.8	20
2 6.1	2 10.3	2 14.8	2 19.7	2 25.1	2 30.8	2 37.2	2 44.1	2 51.7	10
2 3.0	2 7.1	2 11.5	2 16.2	2 21.4	2 27.0	2 33.2	2 39.9	2 47.3	16 0
1 59.6	2 3.6	2 7.8	2 12.5	2 17.5	2 23.0	2 28.9	2 35.4	2 42.6	15 50
1 56.0	1 59.8	2 4.0	2 8.5	2 13.3	2 18.6	2 24.4	2 30.7	2 37.6	40
1 52.2	1 55.9	1 59.9	2 4.2	2 8.9	2 14.0	2 19.6	2 25.7	2 32.4	15 30
1 48.2	1 51.8	1 55.6	1 59.8	2 4.3	2 9.2	2 14.6	2 20.5	2 26.9	20
1 44.0	1 47.5	1 51.2	1 55.2	1 59.5	2 4.2	2 9.4	2 15.0	2 21.2	10
1 39.7	1 42.9	1 46.5	1 50.3	1 54.5	1 59.0	2 3.9	2 9.3	2 15.2	15 0
1 35.1	1 38.2	1 41.6	1 45.3	1 49.2	1 53.5	1 58.2	2 3.3	2 8.9	14 50
1 30.4	1 33.4	1 36.6	1 40.0	1 43.8	1 47.9	1 52.3	1 57.2	2 2.5	40
1 25.5	1 28.3	1 31.4	1 34.6	1 38.2	1 42.0	1 46.2	1 50.8	1 55.9	14 30
1 20.5	1 23.1	1 26.0	1 29.1	1 32.4	1 36.0	1 40.0	1 44.3	1 49.0	20
1 15.4	1 17.8	1 20.5	1 23.4	1 26.5	1 29.9	1 33.6	1 37.6	1 42.0	10
1 10.1	1 12.4	1 14.8	1 17.5	1 20.4	1 23.5	1 27.0	1 30.7	1 34.8	14 0
1 4.7	1 6.8	1 9.1	1 11.5	1 14.2	1 17.1	1 20.2	1 23.7	1 27.5	13 50
0 59.2	1 1.1	1 3.2	1 5.4	1 7.8	1 10.5	1 13.4	1 16.5	1 20.0	40
0 53.5	0 55.3	0 57.2	0 59.2	1 1.4	1 3.8	1 6.4	1 9.2	1 12.4	13 30
0 47.8	0 49.4	0 51.1	0 52.9	0 54.8	0 57.0	0 59.3	1 1.8	1 4.6	20
0 42.0	0 43.4	0 44.9	0 46.5	0 48.2	0 50.1	0 52.1	0 54.3	0 56.8	10
0 36.1	0 37.3	0 38.6	0 40.0	0 41.5	0 43.1	0 44.8	0 46.7	0 48.8	13 0
0 30.2	0 31.2	0 32.3	0 33.4	0 34.7	0 36.0	0 37.5	0 39.1	0 40.8	12 50
0 24.2	0 25.0	0 25.9	0 26.8	0 27.8	0 28.9	0 30.0	0 31.3	0 32.7	40
0 18.2	0 18.8	0 19.4	0 20.1	0 20.9	0 21.7	0 22.6	0 23.5	0 24.6	12 30
0 12.2	0 12.6	0 13.0	0 13.4	0 13.9	0 14.5	0 15.1	0 15.7	0 16.4	20
0 6.1	0 6.3	0 6.5	0 6.7	0 7.0	0 7.2	0 7.5	0 7.9	0 8.2	10
0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	12 0

TABLE IVa.

IV has been computed for a declination of 88° 52′ 5″. For other declinations of Polaris
ıon given below should be applied to the Azimuth taken from Table IV.

th.	0′	20′	40′	60′	80′	100′	120′	140′	160′	180′	200′	Azimuth. / Decl.
′	′	′	′	′	′	′	′	′	′	′	′	° ′ ″
	0.0	+0.1	+0.2	+0.4	+0.5	+0.6	+0.7	+0.8	+1.0	+1.1	+1.2	88 51 40
	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	88 51 45
	0.0	+0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.7	88 51 50
	0.0	0.0	+0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	88 51 55
	0.0	0.0	0.0	+0.1	+0.1	+0.1	+0.1	+0.2	+0.2	+0.2	+0.2	88 52 0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	88 52 5
	0.0	0.0	0.0	−0.1	−0.1	−0.1	−0.1	−0.2	−0.2	−0.2	−0.2	88 52 10
	0.0	0.0	−0.1	−0.1	−0.2	−0.2	−0.3	−0.3	−0.4	−0.4	−0.5	88 52 15
	0.0	−0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.7	88 52 20
	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	88 52 25
	0.0	−0.1	−0.2	−0.4	−0.5	−0.6	−0.7	−0.8	−1.0	−1.1	−1.2	88 52 30

AZIMUTH OF POLARIS AT ELONGATION, 1917.

Decl.	88° 51′ 40″	88° 51′ 50″	88° 52′ 0″	88° 52′ 10″	88° 52′ 20″	88° 52′ 30″	Variation for— 1′ of Lat.	Variation for— 1″ of δ.
′	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	″	″
0	1 18 54.4	1 18 42.8	1 18 31.3	1 18 19.7	1 18 8.2	1 17 56.6	+0.79	−1.16
10	1 19 2.4	1 18 50.8	1 18 39.2	1 18 27.7	1 18 16.1	1 18 4.5	0.80	1.16
20	1 19 10.4	1 18 58.8	1 18 47.2	1 18 35.7	1 18 24.1	1 18 12.5	0.80	1.16
30	1 19 18.5	1 19 6.9	1 18 55.3	1 18 43.7	1 18 32.1	1 18 20.5	0.81	1.16
40	1 19 26.7	1 19 15.1	1 19 3.5	1 18 51.8	1 18 40.2	1 18 28.6	0.82	1.16
50	1 19 35.0	1 19 23.3	1 19 11.7	1 19 0.0	1 18 48.4	1 18 36.8	+0.82	−1.16
0	1 19 43.3	1 19 31.6	1 19 20.0	1 19 8.3	1 18 56.6	1 18 45.0	0.83	1.17
10	1 19 51.7	1 19 40.0	1 19 28.3	1 19 16.6	1 19 4.9	1 18 53.3	0.84	1.17
20	1 20 0.2	1 19 48.5	1 19 36.8	1 19 25.0	1 19 13.3	1 19 1.6	0.85	1.17
30	1 20 8.7	1 19 57.0	1 19 45.3	1 19 33.5	1 19 21.8	1 19 10.1	0.85	1.17
40	1 20 17.3	1 20 5.6	1 19 53.8	1 19 42.1	1 19 30.3	1 19 18.6	+0.86	−1.17
50	1 20 26.0	1 20 14.2	1 20 2.5	1 19 50.7	1 19 38.9	1 19 27.2	0.87	1.18
0	1 20 34.8	1 20 23.0	1 20 11.2	1 19 59.4	1 19 47.6	1 19 35.8	0.87	1.18
10	1 20 43.6	1 20 31.8	1 20 19.9	1 20 8.1	1 19 56.3	1 19 44.5	0.88	1.18
20	1 20 52.5	1 20 40.6	1 20 28.8	1 20 17.0	1 20 5.1	1 19 53.3	0.89	1.18
30	1 21 1.5	1 20 49.6	1 20 37.7	1 20 25.9	1 20 14.0	1 20 2.2	+0.90	−1.19
40	1 21 10.5	1 20 58.6	1 20 46.7	1 20 34.9	1 20 23.0	1 20 11.1	0.90	1.19
50	1 21 19.6	1 21 7.7	1 20 55.8	1 20 43.9	1 20 32.0	1 20 20.1	0.91	1.19
0	1 21 28.8	1 21 16.9	1 21 5.0	1 20 53.1	1 20 41.1	1 20 29.2	0.92	1.19
10	1 21 38.1	1 21 26.2	1 21 14.2	1 21 2.3	1 20 50.3	1 20 38.4	0.92	1.19
20	1 21 47.4	1 21 35.5	1 21 23.5	1 21 11.5	1 20 59.6	1 20 47.6	+0.93	−1.20
30	1 21 56.9	1 21 44.9	1 21 32.9	1 21 20.9	1 21 8.9	1 20 56.9	0.94	1.20
40	1 22 6.4	1 21 54.4	1 21 42.4	1 21 30.3	1 21 18.3	1 21 6.3	0.95	1.20
50	1 22 16.0	1 22 3.9	1 21 51.9	1 21 39.9	1 21 27.8	1 21 15.8	0.96	1.20
0	1 22 25.6	1 22 13.6	1 22 1.5	1 21 49.5	1 21 37.4	1 21 25.3	0.96	1.21
10	1 22 35.4	1 22 23.3	1 22 11.2	1 21 59.1	1 21 47.0	1 21 34.9	+0.97	−1.21
20	1 22 45.2	1 22 33.1	1 22 21.0	1 22 8.9	1 21 56.8	1 21 44.6	0.98	1.21
30	1 22 55.1	1 22 43.0	1 22 30.9	1 22 18.7	1 22 6.6	1 21 54.4	0.99	1.21
40	1 23 5.1	1 22 53.0	1 22 40.8	1 22 28.6	1 22 16.5	1 22 4.3	1.00	1.22
50	1 23 15.2	1 23 3.0	1 22 50.8	1 22 38.6	1 22 26.5	1 22 14.3	1.00	1.22
0	1 23 25.3	1 23 13.1	1 23 0.9	1 22 48.7	1 22 36.5	1 22 24.3	+1.01	−1.22
10	1 23 35.6	1 23 23.4	1 23 11.1	1 22 58.9	1 22 46.6	1 22 34.4	1.02	1.22
20	1 23 45.9	1 23 33.6	1 23 21.4	1 23 9.1	1 22 56.9	1 22 44.6	1.03	1.23
30	1 23 56.3	1 23 44.0	1 23 31.7	1 23 19.5	1 23 7.2	1 22 54.9	1.04	1.23
40	1 24 6.8	1 23 54.5	1 23 42.2	1 23 29.9	1 23 17.6	1 23 5.3	1.05	1.23
50	1 24 17.4	1 24 5.0	1 23 52.7	1 23 40.4	1 23 28.0	1 23 15.7	+1.06	−1.23
0	1 24 28.0	1 24 15.7	1 24 3.3	1 23 51.0	1 23 38.6	1 23 26.2	1.06	1.24
10	1 24 38.8	1 24 26.4	1 24 14.0	1 24 1.6	1 23 49.3	1 23 36.9	1.07	1.24
20	1 24 49.6	1 24 37.2	1 24 24.8	1 24 12.4	1 24 0.0	1 23 47.6	1.08	1.24
30	1 25 0.6	1 24 48.2	1 24 35.7	1 24 23.3	1 24 10.8	1 23 58.4	1.09	1.24
40	1 25 11.6	1 24 59.2	1 24 46.7	1 24 34.2	1 24 21.7	1 24 9.3	+1.10	−1.25
50	1 25 22.7	1 25 10.2	1 24 57.7	1 24 45.2	1 24 32.7	1 24 20.2	1.11	1.25
0	1 25 34.0	1 25 21.4	1 25 8.9	1 24 56.4	1 24 43.9	1 24 31.3	1.12	1.25
10	1 25 45.2	1 25 32.7	1 25 20.1	1 25 7.6	1 24 55.1	1 24 42.5	1.13	1.25
20	1 25 56.6	1 25 44.1	1 25 31.5	1 25 18.9	1 25 6.3	1 24 53.8	1.14	1.26
30	1 26 8.1	1 25 55.5	1 25 42.9	1 25 30.3	1 25 17.7	1 25 5.1	+1.15	−1.26
40	1 26 19.7	1 26 7.1	1 25 54.5	1 25 41.8	1 25 29.2	1 25 16.5	1.16	1.26
50	1 26 31.4	1 26 18.7	1 26 6.1	1 25 53.4	1 25 40.8	1 25 28.1	1.16	1.27
0	1 26 43.2	1 26 30.5	1 26 17.8	1 26 5.1	1 25 52.4	1 25 39.7	1.17	1.27
10	1 26 55.1	1 26 42.3	1 26 29.6	1 26 16.9	1 26 4.2	1 25 51.5	1.18	1.27
20	1 27 7.0	1 26 54.3	1 26 41.5	1 26 28.8	1 26 16.0	1 26 3.3	+1.19	−1.27
30	1 27 19.1	1 27 6.3	1 26 53.5	1 26 40.8	1 26 28.0	1 26 15.2	1.20	1.28
40	1 27 31.3	1 27 18.5	1 27 5.7	1 26 52.9	1 26 40.0	1 26 27.2	1.21	1.28
50	1 27 43.6	1 27 30.7	1 27 17.9	1 27 5.0	1 26 52.2	1 26 39.4	1.22	1.28
0	1 27 55.9	1 27 43.1	1 27 30.2	1 27 17.3	1 27 4.5	1 26 51.6	1.23	1.29
10	1 28 8.4	1 27 55.5	1 27 42.6	1 27 29.7	1 27 16.8	1 27 3.9	+1.24	−1.29
20	1 28 21.0	1 28 8.1	1 27 55.1	1 27 42.2	1 27 29.3	1 27 16.4	1.26	1.29
30	1 28 33.7	1 28 20.7	1 28 7.8	1 27 54.8	1 27 41.9	1 27 28.9	1.27	1.30
40	1 28 46.5	1 28 33.5	1 28 20.5	1 28 7.5	1 27 54.5	1 27 41.5	1.28	1.30
50	1 28 59.4	1 28 46.4	1 28 33.4	1 28 20.3	1 28 7.3	1 27 54.3	1.29	1.30
0	1 29 12.4	1 28 59.4	1 28 46.3	1 28 33.2	1 28 20.2	1 28 7.1	+1.30	−1.31

TABLE V.

AZIMUTH OF POLARIS AT ELONGATION, 1917.

Decl. / Lat.	88° 51′ 40″	88° 51′ 50″	88° 52′ 0″	88° 52′ 10″	88° 52′ 20″	88° 52′ 30″	Variatio[n] for 1′ of Lat.
° ′	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	″
40 0	1 29 12.4	1 28 59.4	1 28 46.3	1 28 33.2	1 28 20.2	1 28 7.1	+1.30
40 10	1 29 25.5	1 29 12.4	1 28 59.4	1 28 46.3	1 28 33.2	1 28 20.1	1.31
40 20	1 29 38.8	1 29 25.7	1 29 12.5	1 28 59.4	1 28 46.3	1 28 33.2	1.32
40 30	1 29 52.1	1 29 39.0	1 29 25.8	1 29 12.7	1 28 59.5	1 28 46.4	1.33
40 40	1 30 5.6	1 29 52.4	1 29 39.2	1 29 26.0	1 29 12.8	1 28 59.6	1.34
40 50	1 30 19.1	1 30 5.9	1 29 52.7	1 29 39.5	1 29 26.3	1 29 13.0	+1.35
41 0	1 30 32.8	1 30 19.6	1 30 6.3	1 29 53.1	1 29 39.8	1 29 26.6	1.37
41 10	1 30 46.6	1 30 33.3	1 30 20.1	1 30 6.8	1 29 53.5	1 29 40.2	1.38
41 20	1 31 0.5	1 30 47.2	1 30 33.9	1 30 20.6	1 30 7.3	1 29 53.9	1.39
41 30	1 31 14.6	1 31 1.2	1 30 47.9	1 30 34.5	1 30 21.2	1 30 7.8	1.40
41 40	1 31 28.7	1 31 15.3	1 31 2.0	1 30 48.6	1 30 35.2	1 30 21.8	+1.41
41 50	1 31 43.0	1 31 29.6	1 31 16.2	1 31 2.7	1 30 49.3	1 30 35.9	1.42
42 0	1 31 57.4	1 31 43.9	1 31 30.5	1 31 17.0	1 31 3.6	1 30 50.1	1.43
42 10	1 32 11.9	1 31 58.4	1 31 44.9	1 31 31.4	1 31 17.9	1 31 4.4	1.45
42 20	1 32 26.5	1 32 13.0	1 31 59.5	1 31 46.0	1 31 32.4	1 31 18.9	1.46
42 30	1 32 41.3	1 32 27.7	1 32 14.2	1 32 0.6	1 31 47.0	1 31 33.5	+1.47
42 40	1 32 56.2	1 32 42.6	1 32 29.0	1 32 15.4	1 32 1.8	1 31 48.2	1.48
42 50	1 33 11.2	1 32 57.6	1 32 43.9	1 32 30.3	1 32 16.7	1 32 3.0	1.50
43 0	1 33 26.4	1 33 12.7	1 32 59.0	1 32 45.3	1 32 31.7	1 32 18.0	1.51
43 10	1 33 41.6	1 33 27.9	1 33 14.2	1 33 0.5	1 32 46.8	1 32 33.1	1.52
43 20	1 33 57.0	1 33 43.3	1 33 29.5	1 33 15.8	1 33 2.0	1 32 48.3	+1.54
43 30	1 34 12.6	1 33 58.8	1 33 45.0	1 33 31.2	1 33 17.4	1 33 3.6	1.55
43 40	1 34 28.3	1 34 14.4	1 34 0.6	1 33 46.8	1 33 33.0	1 33 19.1	1.56
43 50	1 34 44.1	1 34 30.2	1 34 16.3	1 34 2.5	1 33 48.6	1 33 34.7	1.58
44 0	1 35 0.0	1 34 46.1	1 34 32.2	1 34 18.3	1 34 4.4	1 33 50.5	1.59
44 10	1 35 16.1	1 35 2.2	1 34 48.2	1 34 34.3	1 34 20.3	1 34 6.4	+1.61
44 20	1 35 32.3	1 35 18.4	1 35 4.4	1 34 50.4	1 34 36.4	1 34 22.4	1.62
44 30	1 35 48.7	1 35 34.7	1 35 20.7	1 35 6.6	1 34 52.6	1 34 38.6	1.63
44 40	1 36 5.2	1 35 51.2	1 35 37.1	1 35 23.0	1 35 9.0	1 34 54.9	1.64
44 50	1 36 21.9	1 36 7.8	1 35 53.6	1 35 39.5	1 35 25.4	1 35 11.3	1.66
45 0	1 36 38.7	1 36 24.5	1 36 10.4	1 35 56.2	1 35 42.1	1 35 27.9	+1.68
45 10	1 36 55.6	1 36 41.4	1 36 27.2	1 36 13.0	1 35 58.9	1 35 44.7	1.69
45 20	1 37 12.7	1 36 58.5	1 36 44.2	1 36 30.0	1 36 15.8	1 36 1.6	1.71
45 30	1 37 29.9	1 37 15.7	1 37 1.4	1 36 47.1	1 36 32.9	1 36 18.6	1.72
45 40	1 37 47.3	1 37 33.0	1 37 18.7	1 37 4.4	1 36 50.1	1 36 35.8	1.74
45 50	1 38 4.9	1 37 50.5	1 37 36.2	1 37 21.8	1 37 7.5	1 36 53.1	+1.75
46 0	1 38 22.6	1 38 8.2	1 37 53.8	1 37 39.4	1 37 25.0	1 37 10.6	1.77
46 10	1 38 40.5	1 38 26.0	1 38 11.6	1 37 57.1	1 37 42.7	1 37 28.3	1.78
46 20	1 38 58.5	1 38 44.0	1 38 29.5	1 38 15.0	1 38 0.5	1 37 46.1	1.80
46 30	1 39 16.7	1 39 2.1	1 38 47.6	1 38 33.1	1 38 18.5	1 38 4.0	1.82
46 40	1 39 35.0	1 39 20.4	1 39 5.9	1 38 51.3	1 38 36.7	1 38 22.1	+1.83
46 50	1 39 53.5	1 39 38.9	1 39 24.3	1 39 9.7	1 38 55.0	1 38 40.4	1.85
47 0	1 40 12.2	1 39 57.5	1 39 42.9	1 39 28.2	1 39 13.5	1 38 58.9	1.86
47 10	1 40 31.0	1 40 16.3	1 40 1.6	1 39 46.9	1 39 32.2	1 39 17.5	1.88
47 20	1 40 50.1	1 40 35.3	1 40 20.5	1 40 5.8	1 39 51.0	1 39 36.3	1.90
47 30	1 41 9.2	1 40 54.4	1 40 39.6	1 40 24.8	1 40 10.0	1 39 55.2	+1.92
47 40	1 41 28.6	1 41 13.8	1 40 58.9	1 40 44.0	1 40 29.2	1 40 14.3	1.93
47 50	1 41 48.1	1 41 33.2	1 41 18.3	1 41 3.4	1 40 48.5	1 40 33.6	1.95
48 0	1 42 7.8	1 41 52.9	1 41 38.0	1 41 23.0	1 41 8.1	1 40 53.1	1.97
48 10	1 42 27.7	1 42 12.8	1 41 57.8	1 41 42.8	1 41 27.8	1 41 12.8	1.98
48 20	1 42 47.8	1 42 32.8	1 42 17.7	1 42 2.7	1 41 47.6	1 41 32.6	+2.00
48 30	1 43 8.1	1 42 53.0	1 42 37.9	1 42 22.8	1 42 7.7	1 41 52.6	2.02
48 40	1 43 28.5	1 43 13.4	1 42 58.2	1 42 43.1	1 42 27.9	1 42 12.8	2.04
48 50	1 43 49.2	1 43 34.0	1 43 18.8	1 43 3.6	1 42 48.4	1 42 33.2	2.06
49 0	1 44 10.0	1 43 54.7	1 43 39.5	1 43 24.2	1 43 9.0	1 42 53.8	2.08
49 10	1 44 31.0	1 44 15.7	1 44 0.4	1 43 45.1	1 43 29.8	1 43 14.5	+2.10
49 20	1 44 52.2	1 44 36.9	1 44 21.5	1 44 6.2	1 43 50.8	1 43 35.5	2.12
49 30	1 45 13.6	1 44 58.2	1 44 42.8	1 44 27.4	1 44 12.0	1 43 56.6	2.14
49 40	1 45 35.2	1 45 19.8	1 45 4.3	1 44 48.9	1 44 33.4	1 44 18.0	2.16
49 50	1 45 57.0	1 45 41.5	1 45 26.0	1 45 10.5	1 44 55.0	1 44 39.5	2.18
50 0	1 46 19.1	1 46 3.5	1 45 47.9	1 45 32.4	1 45 16.8	1 45 1.3	+2.[illegible]

AZIMUTH OF POLARIS AT ELONGATION, 1917.

88° 51′ 40″	88° 51′ 50″	88° 52′ 0″	88° 52′ 10″	88° 52′ 20″	88° 52′ 30″	Variation for— 1′ of Lat.	Variation for— 1″ of δ.
° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	″	″
1 46 19.1	1 46 3.5	1 45 47.9	1 45 32.4	1 45 16.8	1 45 1.3	+2.20	−1.56
1 46 41.3	1 46 25.7	1 46 10.1	1 45 54.4	1 45 38.8	1 45 23.2	2.22	1.56
1 47 3.7	1 46 48.1	1 46 32.4	1 46 16.7	1 46 1.1	1 45 45.4	2.24	1.57
1 47 26.4	1 47 10.6	1 46 54.9	1 46 39.2	1 46 23.5	1 46 7.7	2.26	1.57
1 47 49.2	1 47 33.5	1 47 17.7	1 47 1.9	1 46 46.1	1 46 30.3	2.28	1.58
1 48 12.3	1 47 56.5	1 47 40.6	1 47 24.8	1 47 9.0	1 46 53.1	+2.30	−1.58
1 48 35.6	1 48 19.7	1 48 3.8	1 47 47.9	1 47 32.0	1 47 16.1	2.33	1.59
1 48 59.1	1 48 43.2	1 48 27.2	1 48 11.3	1 47 55.3	1 47 39.4	2.35	1.59
1 49 22.9	1 49 6.9	1 48 50.9	1 48 34.9	1 48 18.9	1 48 2.9	2.37	1.60
1 49 46.9	1 49 30.8	1 49 14.7	1 48 58.7	1 48 42.6	1 48 26.5	2.39	1.61
1 50 11.1	1 49 55.0	1 49 38.8	1 49 22.7	1 49 6.6	1 48 50.4	+2.42	−1.61
1 50 35.5	1 50 19.4	1 50 3.2	1 49 47.0	1 49 30.8	1 49 14.6	2.44	1.62
1 51 0.2	1 50 44.0	1 50 27.7	1 50 11.5	1 49 55.2	1 49 39.0	2.46	1.62
1 51 25.1	1 51 8.8	1 50 52.5	1 50 36.2	1 50 19.9	1 50 3.6	2.49	1.63
1 51 50.3	1 51 34.0	1 51 17.6	1 51 1.2	1 50 44.8	1 50 28.5	2.51	1.64
1 52 15.7	1 51 59.3	1 51 42.9	1 51 26.4	1 51 10.0	1 50 53.6	+2.54	−1.64
1 52 41.4	1 52 24.9	1 52 8.4	1 51 51.9	1 51 35.4	1 51 18.9	2.56	1.65
1 53 7.3	1 52 50.8	1 52 34.2	1 52 17.7	1 52 1.1	1 51 44.5	2.59	1.66
1 53 33.5	1 53 16.9	1 53 0.3	1 52 43.6	1 52 27.0	1 52 10.4	2.61	1.66
1 54 0.0	1 53 43.3	1 53 26.6	1 53 9.9	1 52 53.2	1 52 36.5	2.64	1.67
1 54 26.7	1 54 9.9	1 53 53.2	1 53 36.4	1 53 19.7	1 53 2.9	+2.67	−1.68
1 54 53.6	1 54 36.8	1 54 20.0	1 54 3.2	1 53 46.4	1 53 29.6	2.69	1.68
1 55 20.9	1 55 4.0	1 54 47.1	1 54 30.2	1 54 13.4	1 53 56.5	2.72	1.69
1 55 48.4	1 55 31.5	1 55 14.5	1 54 57.6	1 54 40.6	1 54 23.7	2.75	1.69
1 56 16.2	1 55 59.2	1 55 42.2	1 55 25.1	1 55 8.1	1 54 51.1	2.78	1.70
1 56 44.3	1 56 27.2	1 56 10.1	1 55 53.0	1 55 35.9	1 55 18.8	+2.80	−1.71
1 57 12.7	1 56 55.5	1 56 38.3	1 56 21.2	1 56 4.0	1 55 46.9	2.83	1.72
1 57 41.3	1 57 24.1	1 57 6.9	1 56 49.6	1 56 32.4	1 56 15.2	2.86	1.72
1 58 10.3	1 57 53.0	1 57 35.7	1 57 18.4	1 57 1.1	1 56 43.8	2.89	1.73
1 58 39.5	1 58 22.2	1 58 4.8	1 57 47.4	1 57 30.1	1 57 12.7	2.92	1.74
1 59 9.1	1 58 51.6	1 58 34.2	1 58 16.8	1 57 59.3	1 57 41.9	+2.95	−1.74
1 59 39.0	1 59 21.4	1 59 3.9	1 58 46.4	1 58 28.9	1 58 11.4	2.98	1.75
2 0 9.1	1 59 51.6	1 59 34.0	1 59 16.4	1 58 58.8	1 58 41.2	3.01	1.76
2 0 39.6	2 0 22.0	2 0 4.3	1 59 46.6	1 59 29.0	1 59 11.4	3.04	1.76
2 1 10.4	2 0 52.7	2 0 35.0	2 0 17.2	1 59 59.5	1 59 41.8	3.08	1.77
2 1 41.6	2 1 23.8	2 1 6.0	2 0 48.1	2 0 30.3	2 0 12.5	+3.11	−1.78
2 2 13.1	2 1 55.2	2 1 37.3	2 1 19.4	2 1 1.5	2 0 43.6	3.14	1.79
2 2 44.9	2 2 26.9	2 2 8.9	2 1 51.0	2 1 33.0	2 1 15.0	3.18	1.80
2 3 17.0	2 2 59.0	2 2 40.9	2 2 22.9	2 2 4.8	2 1 46.8	3.21	1.80
2 3 49.5	2 3 31.4	2 3 13.2	2 2 55.1	2 2 37.0	2 2 18.9	3.24	1.81
2 4 22.3	2 4 4.1	2 3 45.9	2 3 27.7	2 3 9.5	2 2 51.3	+3.28	−1.82
2 4 55.5	2 4 37.2	2 4 19.0	2 4 0.7	2 3 42.4	2 3 24.1	3.32	1.83
2 5 29.1	2 5 10.7	2 4 52.4	2 4 34.0	2 4 15.6	2 3 57.2	3.35	1.84
2 6 3.0	2 5 44.6	2 5 26.1	2 5 7.7	2 4 49.2	2 4 30.8	3.38	1.84
2 6 37.3	2 6 18.8	2 6 0.2	2 5 41.7	2 5 23.2	2 5 4.6	3.42	1.85
2 7 12.0	2 6 53.4	2 6 34.7	2 6 16.1	2 5 57.5	2 5 38.9	+3.46	−1.86
2 7 47.0	2 7 28.3	2 7 9.6	2 6 50.9	2 6 32.2	2 6 13.5	3.50	1.87
2 8 22.5	2 8 3.7	2 7 44.9	2 7 26.1	2 7 7.3	2 6 48.5	3.54	1.88
2 8 58.3	2 8 39.4	2 8 20.6	2 8 1.7	2 7 42.8	2 7 23.9	3.58	1.89
2 9 34.6	2 9 15.6	2 8 56.6	2 8 37.7	2 8 18.7	2 7 59.7	3.62	1.90
2 10 11.2	2 9 52.2	2 9 33.1	2 9 14.0	2 8 55.0	2 8 35.9	+3.66	−1.91
2 10 48.3	2 10 29.1	2 10 10.0	2 9 50.8	2 9 31.7	2 9 12.6	3.71	1.91
2 11 25.8	2 11 6.5	2 10 47.3	2 10 28.1	2 10 8.8	2 9 49.6	3.75	1.92
2 12 3.7	2 11 44.4	2 11 25.0	2 11 5.7	2 10 46.4	2 10 27.0	3.79	1.93
2 12 42.0	2 12 22.6	2 12 3.2	2 11 43.8	2 11 24.3	2 11 4.9	3.84	1.94
2 13 20.8	2 13 1.3	2 12 41.8	2 12 22.3	2 12 2.7	2 11 43.2	+3.88	−1.95
2 14 0.0	2 13 40.4	2 13 20.8	2 13 1.2	2 12 41.6	2 12 22.0	3.92	1.96
2 14 39.7	2 14 20.0	2 14 0.3	2 13 40.6	2 13 20.9	2 13 1.2	3.97	1.97
2 15 19.9	2 15 0.1	2 14 40.3	2 14 20.5	2 14 0.6	2 13 40.8	4.02	1.98
2 16 0.5	2 15 40.6	2 15 20.7	2 15 0.8	2 14 40.9	2 14 21.0	4.06	1.99
2 16 41.6	2 16 21.6	2 16 1.6	2 15 41.6	2 15 21.6	2 15 1.6	+4.11	−2.0

:DUCING TO ELONGATION OBSERVATIONS MADE NEAR ELONGATION.

th long.	1° 0′	1° 10′	1° 20′	1° 30′	1° 40′	1° 50′	2° 0′	2° 10′	Azimuth at Elong. / Time.*
	″	″	″	″	″	″	″	″	m
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
	0.0	0.0	0.0	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	1
	+ 0.1	+ 0.2	+ 0.2	0.2	0.2	0.3	0.3	0.3	2
	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.7	3
	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	4
	+ 0.9	+ 1.0	+ 1.1	+ 1.3	+ 1.4	+ 1.6	+ 1.7	+ 1.9	5
	1.2	1.4	1.6	1.8	2.1	2.3	2.5	2.7	6
	1.7	2.0	2.2	2.5	2.8	3.1	3.4	3.7	7
	2.2	2.6	2.9	3.3	3.7	4.0	4.4	4.8	8
	2.8	3.2	3.7	4.2	4.6	5.1	5.6	6.0	9
	+ 3.4	+ 4.0	+ 4.6	+ 5.1	+ 5.7	+ 6.3	+ 6.9	+ 7.4	10
	4.1	4.8	5.5	6.2	6.9	7.6	8.3	9.0	11
	4.9	5.8	6.6	7.4	8.2	9.0	9.9	10.7	12
	5.8	6.8	7.7	8.7	9.7	10.6	11.6	12.6	13
	6.7	7.8	9.0	10.1	11.2	12.3	13.4	14.6	14
	+ 7.7	+ 9.0	+10.3	+11.6	+12.8	+14.1	+15.4	+16.7	15
	8.8	10.2	11.7	13.2	14.6	16.1	17.5	19.0	16
	9.9	11.5	13.2	14.9	16.5	18.2	19.8	21.5	17
	11.1	12.9	14.8	16.7	18.5	20.4	22.2	24.1	18
	12.4	14.4	16.5	18.6	20.6	22.7	24.7	26.8	19
	+13.7	+16.0	+18.3	+20.6	+22.8	+25.1	+27.4	+29.7	20
	15.1	17.6	20.1	22.7	25.2	27.7	30.2	32.7	21
	16.6	19.3	22.1	24.9	27.6	30.4	33.2	35.9	22
	18.1	21.1	24.2	27.2	30.2	33.2	36.2	39.3	23
	19.7	23.0	26.3	29.6	32.9	36.2	39.5	42.8	24
	+21.4	+25.0	+28.5	+32.1	+35.7	+39.2	+42.8	+46.4	25

th long.	2° 10′	2° 20′	2° 30′	2° 40′	2° 50′	3° 0′	3° 10′	3° 20′	Azimuth at Elong. / Time.*
	″	″	″	″	″	″	″	″	m
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	1
	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.5	2
	0.7	0.7	0.8	0.8	0.9	0.9	1.0	1.0	3
	1.2	1.3	1.4	1.5	1.6	1.6	1.7	1.8	4
	+ 1.9	+ 2.0	+ 2.1	+ 2.3	+ 2.4	+ 2.6	+ 2.7	+ 2.9	5
	2.7	2.9	3.1	3.3	3.5	3.7	3.9	4.1	6
	3.7	3.9	4.2	4.5	4.8	5.0	5.3	5.6	7
	4.8	5.1	5.5	5.9	6.2	6.6	7.0	7.3	8
	6.0	6.5	7.0	7.4	7.9	8.3	8.8	9.3	9
	+ 7.4	+ 8.0	+ 8.6	+ 9.2	+ 9.7	+10.3	+10.9	+11.4	10
	9.0	9.7	10.4	11.1	11.8	12.4	13.1	13.8	11
	10.7	11.5	12.3	13.2	14.0	14.8	15.6	16.5	12
	12.6	13.5	14.5	15.4	16.4	17.4	18.4	19.3	13
	14.6	15.7	16.8	17.9	19.0	20.2	21.3	22.4	14
	+16.7	+18.0	+19.3	+20.6	+21.9	+23.1	+24.4	+25.7	15
	19.0	20.5	21.9	23.4	24.9	26.3	27.8	29.3	16
	21.5	23.1	24.8	26.4	28.1	29.7	31.4	33.0	17
	24.1	25.9	27.8	29.6	31.5	33.3	35.2	37.0	18
	26.8	28.9	30.9	33.0	35.1	37.1	39.2	41.3	19
	+29.7	+32.0	+34.3	+36.6	+38.8	+41.1	+43.4	+45.7	20
	32.7	35.3	37.8	40.3	42.8	45.3	47.9	50.4	21
	35.9	38.7	41.5	44.2	47.0	49.8	52.5	55.3	22
	39.3	42.3	45.3	48.3	51.4	54.4	57.4	60.4	23
	42.8	46.0	49.3	52.6	55.9	59.2	62.5	65.8	24
	+46.4	+49.9	+53.5	+57.1	+60.7	+64.2	+67.8	+71.4	25

l time from elongation.

FOR FINDING THE TIMES OF UPPER AND LOWER CULMINATION OF POLAR[illegible] 1917, FROM THE OBSERVED TIMES WHEN THE STAR IS ON THE SA[illegible] VERTICAL CIRCLE WITH THE STARS ζ URSÆ MAJORIS (MIZAR) *SUB PO[illegible]* AND δ CASSIOPEIÆ *SUB POLO*, RESPECTIVELY.

Except at high latitudes, the pole star at either upper or lower culmination furnish[illegible] simple and convenient method for laying down a meridian line on the earth's surface at p[illegible] in the northern hemisphere. When the local time is unknown and accurate astronomical in[illegible] ments are not available, the time of culmination of Polaris may be found by observing [illegible] instant when Polaris is vertically above (has the same azimuth as) ζ Ursæ Majoris (Mizar) be[illegible] the pole, or δ Cassiopeiæ below the pole. In the former case, for the year 1917, Polaris [illegible] approaching upper culmination and in the latter case it is approaching lower culmination. T[illegible] mean time interval which elapses between either of the observed times above mentioned a[illegible] upper or lower culmination, as the case may be, is given for ζ Ursæ Majoris and δ Cassiopeiæ [illegible] ten-day intervals in the following table. This method can not be used at places south of [illegible] north latitude.

ζ URSÆ MAJORIS (MIZAR). (Upper culmination of Polaris.)

Date. \ Lat.		40°	45°	50°	55°	60°
		m s	m s	m s	m s	m s
Jan.	1	9 26	9 24	9 22	9 19	9 16
	11	9 16	9 14	9 12	9 9	9 6
	21	9 5	9 3	9 1	8 59	8 55
	31	8 54	8 53	8 51	8 48	8 45
Feb.	10	8 44	8 43	8 41	8 38	8 35
	20	8 35	8 34	8 32	8 29	8 26
Mar.	2	8 28	8 26	8 24	8 22	8 18
June	30	9 11	9 10	9 8	9 5	9 2
July	10	9 23	9 21	9 19	9 16	9 12
	20	9 34	9 32	9 30	9 27	9 23
	30	9 44	9 43	9 40	9 38	9 34
Aug.	9	9 55	9 53	9 51	9 48	9 44
	19	10 5	10 3	10 1	9 58	9 54
	29	10 14	10 12	10 9	10 7	10 3
Sept.	8	10 22	10 20	10 17	10 14	10 10
	18	10 28	10 26	10 24	10 21	10 17
	28	10 33	10 31	10 29	10 26	10 22
Oct.	8	10 37	10 35	10 33	10 29	10 26
	18	10 39	10 37	10 35	10 31	10 28
	28	10 39	10 38	10 35	10 32	10 28
Nov.	7	10 38	10 36	10 34	10 31	10 27
	17	10 35	10 33	10 31	10 28	10 24
	27	10 30	10 28	10 26	10 23	10 19
Dec.	7	10 24	10 22	10 19	10 16	10 13
	17	10 16	10 14	10 12	10 8	10 5
	27	10 7	10 5	10 3	10 0	9 56
	31	10 3	10 1	9 59	9 56	9 52

δ CASSIOPEIÆ. (Lower culmination of Polaris.)

Date. \ Lat.		35°	40°	45°	50°	55°
		m s	m s	m s	m s	m [illegible]
Jan.	1	10 33	10 35	10 36	10 39	10 [illegible]
	11	10 22	10 24	10 26	10 28	10 [illegible]
	21	10 12	10 14	10 15	10 18	10 [illegible]
	31	10 1	10 3	10 4	10 7	10 [illegible]
Feb.	10	9 51	9 52	9 54	9 57	9 [illegible]
	20	9 42	9 43	9 45	9 47	9 [illegible]
Mar.	2	9 34	9 35	9 37	9 39	9 42
	12	9 28	9 29	9 31	9 33	9 36
	22	9 23	9 25	9 27	9 29	9 31
Apr.	1	9 21	9 22	9 24	9 26	9 29
	11	9 20	9 22	9 23	9 26	9 28
	21	9 22	9 24	9 25	9 28	9 30
May	1	9 26	9 28	9 29	9 31	9 34
	11	9 32	9 33	9 34	9 37	9 40
	21	9 39	9 40	9 42	9 44	9 47
	31	9 47	9 49	9 50	9 53	9 56
June	10	9 57	9 59	10 0	10 3	10 6
	20	10 8	10 9	10 11	10 13	10 16
	30	10 19	10 20	10 22	10 24	10 27
July	10	10 30	10 32	10 33	10 36	10 39
	20	10 41	10 43	10 44	10 47	10 50
July	30	10 52	10 54	10 56	10 59	11 2
Nov.	27	11 39	11 41	11 43	11 46	11 49
Dec.	7	11 32	11 34	11 36	11 39	11 42
	17	11 24	11 26	11 28	11 31	11 34
	27	11 15	11 17	11 18	11 21	11 24
	31	11 11	11 13	11 14	11 17	11 20

ARENT PLACE, TIME OF UPPER CULMINATION, AND TIME INTERVAL BETWEEN UPPER CULMINATION AND ELONGATION EAST OR WEST, OF POLARIS, 1917.

The local mean time of culmination on any meridian for a given date is found by taking the following table the *Mean Time* of the nearest Greenwich culmination, and applying to e product of the *Var. per Day* by the integral number of intervening days, this product g numerically additive for an earlier date and subtractive for a later date than that given e table; and by applying also the product of the *Var. per Hour* by the longitude from nwich expressed in hours and fractions of an hour, this product being numerically additive ast longitudes and subtractive for West longitudes.

The time interval between upper and lower culmination is 12^h diminished by one-half the erical value of the *Var. per Day.*

The last column below applies to all meridians.

Date.	Upper Culmination, Meridian of Greenwich.					Latitude.	Mean Time Interval, Elongation *minus* Upper Culm.
	Apparent Right Ascension.	Apparent Declination.	Mean Time.	Var. per Day.	Var. per Hour.		
	h m 1 29	° ' +88 51			W. E.		W. E.
	s	"	h m s	m s	s	°	h m
n. 1	89	70.6	6 47 7	−3 56.9	−9.87+	10	+5 58.2−
11	79	71.6	6 7 37	3 57.0	9.88	12	5 58.1
21	68	71.9	5 28 8	3 57.0	9.88	14	5 57.9
31	58	71.5	4 48 38	3 56.9	9.87	16	5 57.7
b. 10	48	70.5	4 9 9	3 56.9	9.87	18	5 57.6
20	39	69.0	3 29 41	−3 56.8	−9.87+	20	+5 57.4−
r. 2	31	66.9	2 50 14	3 56.6	9.86	22	5 57.2
12	25	64.3	2 10 49	3 56.5	9.85	24	5 57.0
22	20	61.5	1 31 25	3 56.3	9.84	26	5 56.8
r. 1	18	58.5	0 52 4	3 56.0	9.83	28	5 56.6
11	17	55.3	0 12 44	−3 55.8	−9.82+	30	+5 56.4−
20	19	52.2	23 33 27	3 55.6	9.82	32	5 56.2
30	23	49.3	22 54 11	3 55.4	9.81	34	5 56.0
y 10	28	46.7	22 14 58	3 55.3	9.80	36	5 55.7
20	35	44.4	21 35 46	3 55.1	9.80	38	5 55.5
30	44	42.5	20 56 35	−3 55.0	−9.79+	40	+5 55.2−
ne 9	54	41.1	20 17 26	3 54.9	9.79	42	5 54.9
19	64	40.2	19 38 17	3 54.8	9.78	44	5 54.7
29	75	39.8	18 59 9	3 54.8	9.78	46	5 54.3
ly 9	87	40.0	18 20 1	3 54.8	9.78	48	5 54.0
19	98	40.7	17 40 54	−3 54.8	−9.78+	50	+5 53.6−
29	109	42.0	17 1 46	3 54.8	9.78	52	5 53.2
g. 8	120	43.7	16 22 37	3 54.9	9.79	54	5 52.8
18	130	45.9	15 43 28	3 54.9	9.79	56	5 52.3
28	139	48.6	15 4 18	3 55.0	9.79	58	5 51.8
pt. 7	147	51.6	14 25 7	−3 55.2	−9.80+	60	+5 51.2−
17	154	54.8	13 45 55	3 55.3	9.80	62	5 50.5
27	160	58.4	13 6 41	3 55.4	9.81	64	5 49.8
t. 7	164	62.0	12 27 26	3 55.6	9.82	66	5 48.9
17	166	65.8	11 48 9	3 55.8	9.82	68	5 47.8
27	167	69.6	11 8 51	−3 55.9	−9.83+	70	+5 46.6−
v. 6	165	73.3	10 29 31	3 56.1	9.84		
16	162	76.8	9 50 9	3 56.3	9.85		
26	158	80.1	9 10 45	3 56.4	9.85		
c. 6	152	83.0	8 31 20	3 56.6	9.86		
16	144	85.5	7 51 53	−3 56.8	−9.87+		
26	135	87.5	7 12 25	−3 56.9	−9.87+		

N THE ARRANGEMENT AND USE OF THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC.

There are in general use three different kinds of time, True Solar Time— ιo called Apparent Solar Time—Mean Solar Time, and Sidereal Time.

True or Apparent Solar Time is measured by the diurnal motion of the ın, the length of the day being the interval between two successive transits the Sun over the same meridian, and the time of day being the hour-angle the Sun westward from the meridian. Owing to the obliquity of the ecliptic ıd to the lack of uniformity of the motion of the Earth in its orbit, the rate motion of the Sun in hour-angle and the length of the apparent solar day e not constant. Therefore clocks and chronometers can not be regulated to ıparent solar time, which may, however, be determined by observations of ıe Sun when visible.

Mean Solar Time is measured by the motion of a fictitious body called the ean Sun, which is supposed to move uniformly in the celestial equator, com- eting the circuit in one tropical year. Since mean solar time is uniform ıd regular in its passage, clocks and watches may be regulated to it, and ıose in ordinary use are usually so regulated.

Mean solar time can not, of course, be determined by direct observation, ıt may be determined indirectly by correcting observations of the Sun for ıe equation of time, or by converting to mean time sidereal time determined y observations of fixed stars.

The Equation of Time is the difference in hour-angle between the true Sun ıd the mean Sun. The true Sun is sometimes before and sometimes behind ıe mean Sun by an amount which varies from zero to about 16 minutes. The quation of time is given for Greenwich mean noon on pages 2–16 and for Vashington apparent noon on pages 514–521.

The Mean Solar Day is the unit of mean solar time and is equal in length o the mean or average of all the true or apparent solar days of the year. It ıay be otherwise defined as the interval of time elapsing between two suc- essive transits of the mean Sun across the meridian of any place.

Sidereal Time or star time, in general terms, is measured by the diurnal ıotion of the fixed stars, or, speaking more precisely, by the diurnal motion f that point on the celestial equator called the vernal equinox, from which ıe right ascensions of the heavenly bodies are measured. Astronomical clocks gulated to sidereal time are called sidereal clocks. Sidereal time may be etermined from observations of stars whose right ascensions are known.

A Sidereal Day is very nearly the length of time in which the Earth rotates ı its axis and is *accurately* defined as the time interval between two suc-

A. M., civil time, is January 8, 14^h, astronomical time; and Januar o'clock, P. M., civil time, is January 9, 2^h, astronomical time.

To convert Astronomical Time into Civil Time.—If the astronomical less than twelve hours, write P. M. after it; if greater than twelve subtract twelve hours from it, mark the result A. M., and add one to tl

To convert Solar or Sidereal Time of any meridian B to that of meridian A, add the difference of longitude expressed in time when A of B, and subtract the difference of longitude when A is west of B.

Greenwich mean time, which at any fixed observatory is obtai applying the longitude to the local mean time, on board ship is usuall from the mean time chronometer set to Greenwich time.

Greenwich mean noon of any date means the noon at the beginning astronomical day.

PART I.—THE EPHEMERIS FOR THE MERIDIAN OF GREEN

Pages 2–17 contain for Greenwich mean noon of each day the *Apparent Right Ascension, Apparent Declination, Semidiameter, Ho Parallax, True Longitude, and Latitude.* They also contain the *Logar the Radius Vector of the Earth*, the *Precession in Longitude*, the *Nuta Longitude*, the *Aberration*, the *True Obliquity*, the *Equation of Time*, the S *Time or Right Ascension of Mean Sun*, and the *Mean Time of Sidereal Adjoining* columns contain, for each Greenwich mean noon, the Vari

ur for those of the quantities for which it seemed advisable to give a rate motion. By multiplying any one of those variations by the hours and rts of an hour from Greenwich mean noon and adding the product alge-bically to the corresponding quantity at noon, we obtain an approximate lue of the quantity in question for any given Greenwich mean time. If eat exactness is desired, the value of the hourly variation is found for the ne halfway between Greenwich mean noon and the given Greenwich mean ne before multiplying by the hours and parts of an hour from Greenwich ean noon.

j. It is to be noted that here, as elsewhere throughout the volume, the posi-ve sign used with declinations or latitudes indicates north and the negative gn south.

↓ The Sun's *Apparent Right Ascension* and *Declination* are affected both by erration and by nutation, and therefore denote the *apparent* position of the ue Sun. The Sun's *True Longitude* is the true geometric longitude not cor-ected for aberration; it is referred to the true equinox.

The Sun's *Latitude* is referred to the ecliptic of the date.

The Sun's *Declination* is required whenever that body is observed for the urpose of finding latitude, local time, or azimuth.

The Sun's *Semidiameter* is used in reducing the altitude of the upper or wer limb of the Sun to the altitude of the center; and in reducing the angular stance between the limb of the Sun and any other object to the distance from e center of the Sun.

The *Horizontal Parallax* is the angle subtended by the equatorial radius the Earth, as seen from the center of the Sun.

The *Precession in Longitude* is the quantity to be applied to the longitude the Sun referred to the mean equinox of the beginning of the Besselian titious year, i. e., the instant when the Sun's mean longitude is 280°, in der to refer it to the mean equinox of date.

The *Nutation in Longitude* is the quantity to be applied to the longitude a body referred to the mean equinox of date in order to refer it to the true uinox, short-period terms being neglected.

The *Aberration* is the quantity to be subtracted from the true longitude the Sun in order to obtain its apparent longitude.

The *True Obliquity* is the inclination of the Earth's equator to the ecliptic, ort-period terms being neglected.

The corrections to the values of the nutation and the obliquity here given, take account of the short-period terms, may be found on pages 215–216.

The *Equation of Time* is the apparent time of Greenwich mean noon, or e hour angle of the true Sun at that instant. When interpolated to any ven Greenwich mean time, it is the correction to be applied to mean time in der to obtain apparent time.

The *Sidereal Time of Mean Noon* is the right ascension of the mean Sun Greenwich mean noon. It may be reduced for the longitude or to any reenwich mean time by using the hourly variation, $+9^s.8565$; or by Table I, page 693 of this volume, for reducing intervals of mean time to sidereal ne. It is useful in converting mean time to sidereal time. We first find the eenwich mean time, then the right ascension of the mean Sun for that time

and this being added to the local astronomical mean time, i. e., the hour of the mean Sun, will give the hour angle of the vernal equinox, or the si time required.

The sidereal time of mean noon, reduced for the longitude of the pl also used in converting sidereal time to mean time. Subtracting the re value from the given sidereal time gives the interval of sidereal time past and that is converted into the required mean time by subtracting from corresponding reduction of a sidereal interval to a mean-time interval, from Table II, page 690 of this volume. If the sidereal interval is less $3^m\ 56^s.555$, there are two mean times corresponding to the given sidereal one a few minutes after the preceding noon, and the other a few minutes l the following noon, the mean time interval between these two mean being $23^h\ 56^m\ 4^s.09$. The mean time, approximately known, will always which one is to be taken. Instead of using Table II, the reduction of a si to a mean time interval may be found by multiplying $-9^s.8296$ by the and parts of an hour of the sidereal interval.

The *Mean Time of Sidereal Noon* is the number of hours, minutes seconds after Greenwich mean noon when the vernal equinox passe meridian of Greenwich; it may be reduced to any other meridian by the hourly variation, $-9^s.8296$, to effect the necessary interpolation, reduction may be taken directly from Table II. In the same way the r tion may be made to any Greenwich sidereal time, and the result will represent $24^h -$ Right Ascension of the Mean Sun. This column may b veniently used for converting sidereal to mean time, or—which is the problem—for finding the time of meridian passage of a star whose right sion is known, by adding to the mean time of the *preceding* local sidereal the mean time equivalent of the given sidereal time.

As examples of the use of pages 2–17:

1. Let the Sun's declination be required for 1917, April 14, $2^h\ 5^m\ 20^s$, at a place whose longitude is 58° 20′, or $3^h\ 53^m\ 20^s$ west from Greenwich

		h m s
Local mean time	April 14,	2 5 20
Longitude from Greenwich (additive) . .		3 53 20
Greenwich mean time	April 14,	5 58 40

Reducing the minutes and seconds to decimals of an hour, we find this moment is $5^h.978$ after Greenwich mean noon on April 14, or 18 before Greenwich mean noon on April 15.

On page 6 of the Ephemeris we find that the variation of declinatio hour is:

	″
At Greenwich mean noon, April 14	+54.12
At Greenwich mean noon, April 15	+53.73
Difference for one day	− 0.39

If great exactness is desired, we find the amount of this hourly var for the time halfway between Greenwich noon and the time of observ that is, for 3 hours after Greenwich noon of the 14th, this being half of 6 Three hours is 0.125 of a day; so the calculation is as follows:

		″
Variation at Greenwich mean noon, April 14 . .		+54.12
Change in 0.125 of a day. . .	$-0''.39 \times 0.125$	− 0.05
Variation at 3 hours after noon		+54.07
		° ′ ″
Declination at Greenwich noon, April 14 . .		+9 18 2.1
Change in 5.978 hours . .	$+54''.07 \times 5.978$	+ 5 23.2
Sun's declination at time of observation . .		+9 23 25.3

With equal facility the computation might have been made backward from e succeeding noon. Thus in the example just given the time is $18^h.022$ before eenwich noon of April 15; half this interval is about 0.375 of a day, and the urly motion for the middle of the interval is $+53''.88$. Then we find:

		° ′ ″
Declination at Greenwich noon, April 15 . .		+9 39 36.3
Change in −18.022 hours, .	$+53''.88 \times -18.022$	− 16 11.0
Sun's declination at time of observation . .		+9 23 25.3

It will always be well to make the calculation in both ways, as a check; ut if the results differ slightly the one derived from the nearest noon should regarded as the more accurate.

2. Let the Sun's right ascension and the equation of time be required for 917, July 13, $10^h\ 3^m\ 30^s$, A. M., mean time, at a place whose longitude is 5° 15′, or $5^h\ 41^m$ west from Greenwich.

		h m s
Local astronomical mean time	July 12,	22 3 30
Longitude from Greenwich (additive)		5 41 0
Greenwich mean time	July 13,	3 44 30 = $3^h.7417$

		Sun's Right Ascension.		Equation of Time.
		h m s		m s
Greenwich noon, July 13		7 28 38.63		−5 27.74
Change in 3.7417 hours	$10^s.162 \times 3.7417$	+ 38.02	$-0^s.305 \times 3.7417$	− 1.14
		7 29 16.65		−5 28.88

In this case the hourly variations interpolated to half the interval, or .87 after noon, have been used.

3. If the sidereal time is required for the same time and place, we have:

	h m s
Sidereal time at Greenwich mean noon, July 13	7 23 10.89
Reduction for $3^h\ 44^m\ 30^s$ from Table III, or $9^s.8565 \times 3.7417$.	+ 36.88
Add the local astronomical mean time	22 3 30.00
The required sidereal time (rejecting 24^h)	5 27 17.77

4. On 1917, July 13, A. M., at a place whose longitude is 85° 15′ W., supse the sidereal time to be $5^h\ 27^m\ 17^s.77$ and that the corresponding mean me is required.

The astronomical day is July 12; the longitude in time, $+5^h\ 41^m\ 0^s$, $+5^h.6833$.

First solution.

	h m s
Sidereal time at Greenwich mean noon, July 12	7 19 14.34
Reduction for $5^h\ 41^m\ 0^s$ from Table III, or $9^s.8565 \times 5.6833$.	+56.02
The sidereal time at local mean noon, July 12	7 20 10.36
The given sidereal time ($+24^h$, if necessary for the following subtraction)	29 27 17.77
Subtracting the first from the second gives the sidereal interval from noon	22 7 7.41 $= 22^h.11$
Reduction for $22^h\ 7^m\ 7^s.41$ from Table II, or $-9^s.8296 \times 22.1187$	−3 37.42
The required astronomical mean time . . . July 12,	22 3 29.99

Second solution.

	h m s
Mean time at Greenwich sidereal noon . . July 12,	16 38 1.71
Reduction for longitude from Table II, or $-9^s.8296 \times 5.6833$.	−55.86
Mean time of *preceding* local sidereal noon . . July 12,	16 37 5.85
Add the given sidereal time	5 27 17.77
Reduction for $5^h\ 27^m\ 17^s.77$ from Table II, or $-9^s.8296 \times 5.4549$	−53.62
The required astronomical mean time . . . July 12,	22 3 30.00

If there is any doubt about the mean time of the *preceding* local sidereal noon, the first solution is to be preferred.

Pages 18–25 contain the rectangular coordinates of the Sun, referred to the center of the Earth as the origin, and to the true equator and equinox as the plane and point of reference. Each coordinate is given for every Greenwich mean noon and midnight. The columns *Reduc. to Mean Eq'x of 1917.0* give the corrections to be applied to the coordinates for noon in order to obtain the corresponding coordinates referred to the mean equator and equinox of the beginning of the Besselian fictitious year.

Pages 26–117 contain *The Moon's Right Ascension* and *Declination* for each day and hour of Greenwich mean time, referred to the true equator and equinox. They are accompanied by columns of *Variations per Minute*, by means of which, interpolation may be conveniently made to any moment of Greenwich mean time. The right ascension or declination is taken out for the given day and hour of Greenwich mean time; the *Var. per Min.* is multiplied by the minutes and parts of a minute of the Greenwich time, and the product is added numerically in case of the right ascension and algebraically in case of the declination.

Thus, suppose the Moon's right ascension and declination are required for 1917, January 25, $10^h\ 10^m\ 30^s$, astronomical mean time at Greenwich:

		Right Ascension.		*Declination.*
		h m s		° ′ ″
January 25, 10^h		22 47 20.84		−3 11 30.1
Change in 10.5 minutes .	$2^s.2307 \times 10.5$	23.42	$+15''.944 \times 10.5$	+ 2 47.4
January 25, $10^h\ 10^m\ 30^s$		22 47 44.26		−3 8 42.7

For the sake of precision the differences here employed have been interpolated for $5^m.2 = 0^h.09$.

Page 117 contains also the *Phases of the Moon* and the dates of the *Moon's Apogee and Perigee*, or greatest and least distances from the Earth.

Pages 118–133 contain for every Greenwich mean noon and midnight the *oon's Longitude* **and** *Latitude* **referred to the true equinox and the ecliptic,** *Semidiameter*, **and its** *Equatorial Horizontal Parallax*. **The column adjoin-g that of the horizontal parallax gives the variation of that quantity per ur, by means of which it can be reduced to any other Greenwich mean time the manner shown in the preceding examples. When allowing for change the variation itself, note must be taken of the fact that the tabular interval here 12 hours instead of 24. The quantity thus obtained is the equatorial rizontal parallax; to obtain the horizontal parallax at any given place, the rrection for the latitude of the place must be applied. The reduction of e Moon's semidiameter may be readily found by multiplying the reduction the horizontal parallax by 0.2725 (see page xiii), or by simply computing e proportional part.**

If, for example, the semidiameter of the Moon is to be taken out for 1917, arch 10, 7^h, P. M., Greenwich mean time, we see that the difference of the midiameters at noon and midnight of March 10 is $3''.3$; then,

$$12^h : 7^h = 3''.3 : 1''.9$$

hich is the correction to be added to the semidiameter at noon, because the midiameter is increasing. The Moon's semidiameter for March 10, 7^h, is erefore $15' \; 4''.2$.

The Moon's semidiameter and horizontal parallax are required for all bservations of the Moon.

Pages 118–133 contain also: The *Moon's Age*, or the time elapsed since e preceding new Moon, given to tenths of a day; the mean time of the *Moon's ransit, Upper* and *Lower*, at Greenwich, given to tenths of a minute; and the *ariation per Hour* of the latter quantity, that is, the variation for one hour longitude, by means of which the local time of an upper or lower transit the Moon may be computed for any place whose longitude is known.

Pages 134–198 contain for each of the seven major planets the geocentric phemeris followed immediately by the heliocentric ephemeris.

The geocentric ephemeris gives the planet's *Apparent Right Ascension* and *pparent Declination* with the respective *Variations per Hour* or *per Day*. he positions thus given are referred to the true equator and equinox, and re corrected for aberration. The geocentric ephemeris gives also the *Loga-ithm of Distance from Earth* with the *Variation per Hour* or *per Day*, the planet's *emidiameter* and *Horizontal Parallax*, and, to tenths of a minute, the time *Transit Meridian of Greenwich*. All the data, except the last named, are ven for Greenwich mean noon.

The right ascension and declination of a planet are required whenever it observed for time, latitude, or azimuth. The mode of reducing the ephem-is positions of planets to other instants of Greenwich mean time is the same that already given for the Sun. The local mean time of meridian transit any planet at any place can be found by dividing the proper daily difference the ephemeris times by 24, multiplying the quotient by the longitude of the ace expressed in hours and fractions, and applying the product with its oper sign to the time of Greenwich transit.

The heliocentric ephemeris gives the Heliocentric Longitude, Mean Equinox *Date; the Heliocentric Latitude;* and the *Logarithm* of Radius Vector; wi

their respective *Variations per Day*. The heliocentric longitude may be refe to the true equinox by applying nutation. The variations are given for instant of Greenwich mean noon. The column *Reduction to Orbit* contains correction to be applied to the heliocentric longitude in order to obtain longitude measured along the orbit of the planet. This orbit longitud equal to the distance from the mean equinox to the node, plus the dist from the node to the planet. The heliocentric latitude is referred to the ecl of the date. The *Logarithm of Radius Vector* is the logarithm of the dist of the center of the planet from that of the Sun.

PART II.—THE EPHEMERIS FOR THE MERIDIAN OF WA INGTON.

Pages 200–201 contain formulæ for reducing mean positions of star apparent positions, including expressions for the Besselian star-numbers star-constants, and for the independent star-numbers; the whole based u the constants of the Paris Conference of May, 1896, and expressed in notation of Bessel.

Pages 202–205 contain the logarithms of the *Besselian Star-Numbers, A C, D,* for each Washington mean midnight, with the values of E append the bottoms of the pages. The terms of short period have been inclu These numbers serve to reduce the mean place of a star at the beginnin the Besselian fictitious year to its apparent place at any of the dates for wl the numbers are given, and in ordinary cases four-figure logarithms suf but where extreme accuracy is desired the logarithms of A, C, and D are so times needed to five places of decimals. Along with the solar day, the column contains the sidereal hour of Washington mean midnight for cer dates, and by interpolation among them it is easy to find the sidereal t for which any set of quantities is given.

The following is an example of the reduction of a star to apparent plac the Besselian star-numbers:

Computation of the apparent place of 2 Aquilæ, July 2, 1917, for the upper transit at Washin

log a	0.5165	log b	7.2446 n	log c	8.0440	log d	8.8235 n
log A	9.9260	log B	0.0766 n	log C	0.5420	log D	1.3035 n
log a'	0.5166	log b'	9.9941	log c'	9.4341	log d'	8.4152 n
log Aa	0.4425	log Bb	7.3212	log Cc	8.5860	log Dd	0.1270
log Aa'	0.4426	log Bb'	0.0707 n	log Cc'	9.9761	log Dd'	9.7187

		h	m	s		°	′
Mean Place, 1917.0	$\alpha_0=$	18	37	43.817	$\delta_0=$	−9	7
	$Aa=$			+2.770	$Aa'=$		
	$Bb=$			+0.002	$Bb'=$		
	$Cc=$			+0.039	$Cc'=$		
	$Dd=$			+1.340	$Dd'=$		
	$E=$			+0.003	$\tau\mu'=$		
	$\tau\mu=$			+0.001			
Apparent Place, July 2,	$\alpha=$	18	37	47.972	$\delta=$	−9	7

Pages 206–213 contain the *Independent Star-Numbers*, which can freque be advantageously used instead of the *Besselian Star-Numbers*. The term short period have been included. These quantities are connected with tl of Bessel by the relations given on page 200, which also contains the form and precepts for the application of both systems of numbers. In order t

Besselian numbers, it is necessary to have the values of the star-constants, *c*, *d*, *a'*, *b'*, *c'*, *d'*, while the independent star-numbers render it possible to [de]termine the apparent place of a star without computing these star-constants. [Four]-figure logarithms usually suffice, but where extreme accuracy is desired [the] logarithms of g and h are needed to five places of decimals, and G and H [are] needed to one-tenth of a minute of arc. The column τ gives the fraction of [the ye]ar, counted from the beginning of the Besselian fictitious year to each date.

The following is an example of the reduction of a star to apparent place [by] the independent star-numbers:

[Com]putation of the apparent place of 2 Aquilæ, July 2, 1917, for the upper transit at Washington.

	$G = 23^h\ 43^m.9$			$\delta_0 =$	$-9°\ 8'.0$
	$\alpha_0 = 18\ \ 37.7$			$G+\alpha_0 =$	$18^h\ 21^m.6$
	$H = 11\ \ 20.7$			$H+\alpha_0 =$	$5\ \ 58.4$
$\log \frac{1}{15}$	8.8239	$\log \frac{1}{15}$	8.8239	$\alpha_0 =$	$18^h\ 37^m\ 43^s.817$
$\log g$	1.2291	$\log h$	1.3099	$f+f' =$	+2.594
$\sin (G+\alpha_0)$	9.9981 *n*	$\sin (H+\alpha_0)$	0.0000	$(g) =$	+0.181
$\tan \delta_0$	9.2062 *n*	$\sec \delta_0$	0.0055	$(h) =$	+1.378
				$\tau\mu =$	+0.001
$\log (g)$	9.2573	$\log (h)$	0.1393		
				$\alpha =$	18 37 47.971
$\log g$	1.2291	$\log h$	1.3099	$\delta_0 =$	$-9°\ 7'\ 58''.66$
$\cos (G+\alpha_0)$	8.9736	$\cos (H+\alpha_0)$	7.8439	$(g') =$	+1.59
		$\sin \delta_0$	9.2007 *n*	$(h') =$	−0.02
$\log (g')$	0.2027			$(i) =$	+1.49
		$\log (h')$	8.3545 *n*	$\tau\mu' =$	0.00
				$\delta =$	−9 7 55.60
$\log i$	0.1793				
$\cos \delta_0$	9.9945				
$\log (i)$	0.1738				

Page 214 contains for every tenth sidereal day the *Besselian* and *Inde[pe]ndent Star-Numbers*, exclusive of all short-period terms. They are useful in [co]mputing ephemerides of stars, similar to those on pages 316–513, for which [terms] containing short-period terms should not be employed.

Pages 215–216 contain for Washington mean midnight of each day the [sh]ort-period terms of the nutation in longitude and obliquity, for use in con[ne]ction with the formulæ on page 201, and the coefficients mentioned later, [w]hich are given for each star on pages 316–513.

Pages 217–230 contain the *Mean Places of Ten-day Stars* for the beginning [of] the Besselian fictitious year. These pages give also the magnitude, spec[tra]l type, annual variations, and proper motions for each star. The annual [va]riations are to be considered as the differential coefficients of each coordinate [wi]th respect to the time at the beginning of the year.

Page 231 contains, for the *Circumpolar Stars*, the same data as the imme[di]ately preceding pages do for the ten-day stars.

Pages 232–315 contain for every upper transit at Washington the apparent [po]sitions of seventeen northern and eighteen southern circumpolar stars [ar]ranged in the order of their right ascensions. The mean solar time of transit [is] given in the column *Washington Mean Time*, in order that each transit above

and below the pole may be readily identified. Suppose, for examp the transit of Polaris below the pole on January 26 is to be found, and to know whether it precedes or follows the upper transit of the san On page 232 we find that the upper transit occurs January 26.2; tl transit, therefore, occurs January 26.7. But the lower transit of Jul cedes the upper one, which occurs July 1.8. A transit occurring ver at noon may also be identified without a computation to ascertain th mean date, by simply noting the tenth of a day in the column *Wa Mean Time.*

The secant and tangent of the apparent declination for the 15th month and the mean place in right ascension and declination for the be of the year are given for each star at the foot of the page.

Pages 316–513 contain, for every tenth upper transit at Washing apparent places of 790 stars, being all those given in the list of mea of ten-day stars. The *Washington Mean Time* in the left-hand col each page gives the day and tenth of the transit, so that intermediate may be readily identified; and to facilitate interpolation, the differe each coordinate are given for every ten days.

In connection with the ephemeris of each ten-day star there are g the foot of the page, (1) the seconds of the mean place in both right as and declination for the beginning of the year, (2) the secant and the of the mean of the star's greatest and least apparent declinations du year, and (3) the coefficients of the short-period terms of the nutation, of which is explained on page 201.

Pages 514–521 contain, for Washington apparent noon, the *Appare Ascension* and *Declination* of the Sun, the *Equation of Time*, and the *V per Hour* of these quantities; the *Semidiameter* of the Sun, and the *S Time of Semidiameter Passing Meridian.* The last column on each pa tains the *Sidereal Time of Mean Noon.*

The *Equation of Time, Mean–App.* is the correction to be app apparent time in order to obtain mean time. Each number as give mean time of transit of the Sun's center over the meridian of Wasl counted from the nearest noon.

Pages 522–537 contain the *Right Ascension of Center*, the *Geocentri nation of Center*, the *Sidereal Time of Semidiameter Passing Meridian*, t *centric Semidiameter*, and the *Equatorial Horizontal Parallax* of the Mo the *Washington Mean Time* at the moment of each upper and lower over the meridian of Washington.

The *Variation per Hour of Longitude* is the correction to be applied case to the quantity in the preceding column to obtain its value for t of transit over the meridian one hour west of Washington, supposing t of change to be uniform and equal to what it is at the instant of tran the meridian of Washington. The quantities in the third column, wl rected for another longitude by the hourly variations, give the local me of transit for that longitude. By means of the variations per hour of lo any one of the quantities under consideration can be computed wit exactness for the moment of transit over any meridian not more than o distant from Washington. To obtain the same accuracy for more

ridians, we may proceed as follows: Let F represent either the *Washington* *n Time*, the *Right Ascension of Center*, or the *Geocentric Declination of* *ter*, and let V represent the corresponding *Variation per Hour of Longitude*. te down three successive values of F, together with the corresponding es of V, and difference the latter as in the following scheme, where the ddle values, F_0 and V_0, belong to the culmination from which is to be derived value of F for the culmination on the meridian whose longitude is λ:—

Function.	Var. per Hour of Longitude.	Δ′	Δ″
F_{-1}	V_{-1}		
		a'	
F_0	V_0		b
		a''	
F_{+1}	V_{+1}		

Then, for the culmination at the meridian λ

$$F_\lambda = F_0 + \lambda V_0 + \frac{\lambda^2}{48}(a'+a'') + \frac{\lambda^3 b}{864}$$

here λ must be expressed in hours and decimals of an hour, and reckoned om Washington or from 180° from Washington according as the upper or wer culmination is used for the middle value (F_0). Adding twelve hours to e Washington time of lower transit at Washington gives the local time of pper transit at places whose longitude is 180° from Washington.

The column *Bright Limbs* is given to indicate to the observer which limbs re illuminated. When one limb is full and the terminator is within 1″ of e opposite limb, both can be well observed, and in such cases both are indi- ted, the defective limb being indicated by an italic letter or numeral, and the rrection for defective illumination (as seen from Washington) being given in footnote.

Pages 538–554 contain for each of the seven major planets, the geocentric *pparent Right Ascension* and *Declination*, the *Horizontal Parallax*, *Semi- iameter*, *Sidereal Time of Semidiameter Passing Meridian*, and the *Washington lean Time*, for the moments of all transits which it is usually desirable to oserve over the meridian of Washington. The stellar magnitude at opposi- on for Mars, Jupiter, Saturn, Uranus, and Neptune, respectively, is given at e bottom of the page containing the ephemeris of the planet.

PART III.—PHENOMENA.

This part gives the dates of the principal astronomical phenomena of the ear, expressed in Greenwich mean time, except in the case of the occultations sible at Washington, where Washington time is used.

Pages 556–563 contain all necessary data respecting the solar and lunar lipses which occur during the year.

The eclipse elements are given for the moment of conjunction of the Sun d Moon in right ascension, but the subsequent tables and results are com- ited from the exact positions of these bodies at the several instants referred . The times and angles designated as the circumstances of a lunar eclipse main the same throughout all parts of the Earth, and require no explanation yond a mere statement of the fact that in computing them the geometrical

diameter of the Earth's shadow has been augmented in the proportion of 51
The principal circumstances of each total and annular eclipse of the Su stated in five lines, as follows:—

The line entitled "Eclipse begins" gives the Greenwich mean ti which the Moon's penumbra first touches the Earth, together with the la and longitude of the point of contact.

The line entitled "Central eclipse begins" gives the time when the a the Moon's shadow first touches the Earth, and the latitude and longit the point of contact follow.

The line entitled "Central eclipse at local apparent noon" gives th when the axes of the Earth and of the shadow cone lie in the same The latitude and longitude of the point where the axis of the shadow then cuts the Earth's surface follow, and there the eclipse will be centr the Sun will be exactly on the meridian.

The lines entitled "Central eclipse ends" and "Eclipse ends" give, r tively, the times when and the localities where these events occur, th nomena being the converse of those denoted by the similar phrases f beginning.

In the case of partial solar eclipses the axis of the Moon's shadow do come into contact with the Earth, and the three lines entitled, respect "Central eclipse begins," "Central eclipse at local apparent noon," and ' tral eclipse ends," are replaced by a single line entitled "Greatest ecl whereon are given the time when and the latitude and longitude whe eclipse attains its greatest magnitude. The latter phenomenon neces occurs with the Sun in the horizon.

Maps of the Eclipses.—The regions in which each eclipse is visib shown upon the map relating to it, from which may be taken approxim for any place, both the times of the beginning and ending of the eclips its magnitude. The dotted curves show the outline of the shadow fo hour of Greenwich mean time, and therefore pass through all places whe eclipse begins or ends at the hour indicated. To find the instant of begi at any place, we determine by inspection between what pair of these c lines the place is situated. The eclipse will then begin between th responding hours of Greenwich mean time; and the fraction of the hou be determined by dividing the hour in the same proportion as the spac resenting it on the map is divided by the place in question. This di may be made a little more exact by allowing for the changes in the spa indicated by their varying width. The Greenwich mean time thus found be reduced to local mean time by applying the longitude.

As an example, suppose we wish to find the times at which the ecli 1917, January 22, begins and ends at Kasan, Russia, latitude +55 longitude −48° 49′.

For the beginning we compare the distance of the place from the of 18^h and 19^h, and find it to correspond to about 40 minutes from the f thus giving for the approximate time of beginning 18^h 40^m; for the e compare the distance of the place from the curves of 20^h and 21^h, and to be about 50 minutes from the former, thus giving for the approximat of ending 20^h 50^m, and both of these results are probably correct to 3 or 4 minutes.

Changing to local mean time, we shall have—

		Beginning.	Ending.
		d h m	d h m
Greenwich mean time	January	22 18 40	22 20 50
Longitude east		3 15	3 15
Local mean time	January	22 21 55	23 0 5

In the case of total and annular eclipses, a fair estimate of the magnitude the eclipse at any place may be obtained from the position thereof relative the central line and to the limit. On the central line the eclipse is annular total, while between the central line and the limit the maximum magnitude the eclipse is given by the quotient of the distance of the place from the mit divided by the distance of the central line from the limit; the measurements being made upon a line drawn through the place perpendicularly to the ntral line.

More Accurate Computations.—A more accurate determination of the hases, as visible at any point of the Earth's surface, may be obtained from he Besselian elements which are given for every 10 minutes of Greenwich mean time. Their geometric signification is as follows:—

Let us imagine a plane passing through the center of the Earth, perpendicular to the right line joining the centers of the Sun and Moon. This latter line is the axis of the Moon's shadow, and the plane is called the *fundamental plane* or plane of xy. We take the intersection of this plane with that of the Earth's equator as the axis of x, and the center of the Earth as the origin of coordinates. The axis of y is perpendicular to that of x, and directed toward the north; x and y are then the coordinates of the point in which the axis of the shadow intersects the fundamental plane, and they are here expressed in terms of the Earth's equatorial radius as unity. The angle d, of which the sine and cosine are both given, is the declination of that point of the celestial sphere toward which the axis of the shadow is directed; or, in other words, it is the declination of the center of the Sun as seen from the center of the Moon. The angle μ is the Greenwich hour-angle of this same point of the celestial sphere.

The quantities l_1 and l_2 are the radii of the shadow cones upon the fundamental plane, l_1 corresponding to the penumbra, and l_2 to the umbra, or annulus. The notation is that of CHAUVENET'S *Spherical and Practical Astronomy*, in which l_2 is regarded as positive for an annular and negative for a total eclipse.

The angles f_1 and f_2, the tangents of which are given, are the angles which the elements of the respective shadow cones make with the axis of the shadow; or, they are the semiangles of the two cones.

In order to facilitate interpolation to any required moment, the logarithms of x', y', and μ', which are the changes of x, y, and μ, in one minute of time, are given at the bottom of the table.

The method of computing an eclipse from its Besselian elements is based on the fact that at the moments of beginning and ending the distance of the observer from the axis of the shadow or penumbra is equal to the radius of the latter at the point of observation. To find this distance and radius we proceed as follows:

(1) The coordinates of the observer, ξ, η, and ζ, together with their variations in one minute, are computed for some assumed moment of Greenwich mean time, as near as practicable to the true time of the required phase.

For the assumed Greenwich mean time of computation, take fron table of elements the values of sin d, cos d, and μ. Then, with λ for the l tude west from Greenwich, the coordinates of the observer will be—

$$\xi = \rho \cos \varphi' \sin (\mu - \lambda)$$
$$\eta = \rho \sin \varphi' \cos d - \rho \cos \varphi' \sin d \cos (\mu - \lambda) = \eta_1 - \eta_2$$
$$\zeta = \rho \sin \varphi' \sin d + \rho \cos \varphi' \cos d \cos (\mu - \lambda) = \zeta_1 + \zeta_2$$

t their variations in one minute of mean time will be—

$$\xi' = [7.63992]\, \rho \cos \varphi' \cos (\mu - \lambda)$$
$$\eta' = [7.63992]\, \rho \cos \varphi' \sin d \sin (\mu - \lambda) = [7.63992]\, \xi \sin d$$
ζ' is not needed.

(2) For the same assumed moment of Greenwich mean time, take from tables of elements the coordinates x and y of the axis of the shadow, together h their variations for one minute, which are equal to one-tenth of the ferences of two consecutive numbers. These variations are represented by and y', and their logarithms are given beneath the tables of x and y.

(3) The distance m and position-angle M of the axis of the shadow rela- e to the observer, and the relative motions, n and N, are computed by formulæ—

$$m \sin M = x - \xi$$
$$m \cos M = y - \eta$$
$$n \sin N = x' - \xi'$$
$$n \cos N = y' - \eta'$$

(4) Both for the shadow and for the penumbra, the radius L at the dis- nce ζ from the fundamental plane is computed by the formulæ—

$$L = l - \zeta \tan f$$

and f being taken from the table of elements, and ζ computed in (1).

(5) If the time chosen for computation is exactly that of the beginning or ding of the eclipse, we shall have—

$$m = L$$

ut, as this condition will rarely be fulfilled on a first trial, a correction τ to e assumed time is computed thus: Find the angle ψ from the equation—

$$\sin \psi = \frac{m \sin (M - N)}{L}$$

here will be two values for this angle, of which one will be in the first and e other in the second quadrant when $\sin \psi$ is positive, and one in the third d the other in the fourth quadrant when $\sin \psi$ is negative; but simplicity ill be gained by taking only that value of ψ for which $\cos \psi$ is positive. This lue lies between the limits $+90°$ and $-90°$. The correction τ to the assumed ne of beginning or ending of the eclipse will then be found, in minutes, om—

$$\tau = -\frac{m \cos (M - N)}{n} \mp \frac{L \cos \psi}{n}$$

ere the double sign is to be taken negative for the beginning and positive r the ending.

However, one such pair of values of τ can not give the times of both ginning and ending with accuracy. To attain that, we must commence the mputation by assuming two times, one near the beginning and the other ar the ending of the eclipse, both of which may be derived from the chart th sufficient exactness. The computation for the first assumed time will e a small value of τ which, when applied to the assumed time, will give

fourth place of decimals, the times employed are generally correct within a second of time. If they differ too widely, the computer must use his own judgment as to making further corrections and computations.

Position-angle of Point of Contact.—The position-angle P, of the point of contact, reckoned from the north point of the Sun's limb toward the east, is found by the formulæ—

$$P = N - \psi \pm 180° \quad \text{for the beginning,}$$
$$\text{or} \quad P = N + \psi \quad \text{for the ending,}$$

it being assumed that, in each case, the value of ψ is taken between the limits $\pm 90°$.

Computation of the Solar Eclipse of 1917, January 22, for Kasan, Russia.

The position of Kasan is—

$$\text{Latitude,} \quad \varphi = +55° \; 50' \; 20''$$
$$\text{Longitude,} \quad \lambda = -48 \; 49 \; 8$$

and its geocentric coordinates are—

$$\rho \sin \varphi' = 9.91582$$
$$\rho \cos \varphi' = 9.75087$$

'rom the Eclipse Chart we find the approximate times of the phases to

		d	h	m	
Beginning	January	22	18	40	Greenwich Mean Time.
Ending		22	20	50	

		Beginning.	Ending.
T	Jan. 22,	$18^h\ 40^m$	$20^h\ 50^m$
		° ′ ″	° ′ ″
μ		277 1 42	309 31 30
λ		− 48 49 8	− 48 49 8
$\mu-\lambda$		+325 50 50	+358 20 38
$\rho \cos \varphi'$		9.75037	9.75037
$\sin(\mu-\lambda)$		9.74927 n	8.46091 n
$\log \xi$		9.49964 n	8.21128 n
ξ		−0.31597	−0.01627
$\rho \sin \varphi'$		9.91582	9.91582
$\cos d$		9.97417	9.97423
$\log \eta_1$		9.88999	9.89005
η_1		+0.77623	+0.77633
$\rho \cos \varphi'$		9.75037	9.75037
$\sin d$		9.52487 n	9.52445 n
$\cos(\mu-\lambda)$		9.91780	9.99982
$\log \eta_2$		9.19304 n	9.27464 n
η_2		−0.15597	−0.18821
$\eta=\eta_1-\eta_2$		+0.93220	+0.96454
$\rho \sin \varphi' \sin d$		9.44069 n	9.44027 n
ζ_1		−0.27586	−0.27559
$\rho \cos \varphi' \cos d \cos(\mu-\lambda)$		9.64234	9.72442
ζ_2		+0.43887	+0.53018
$\zeta=\zeta_1+\zeta_2$		+0.16301	+0.25459
const. log.		7.63992	7.63992
$\rho \cos \varphi' \cos(\mu-\lambda)$		9.66817	9.75019
$\log \xi'$		7.30809	7.39011
ξ'		+0.002033	+0.002455
const. log.		7.63992	7.63992
$\xi \sin d$		9.02451	7.73573
$\log \eta'$		6.66443	5.37565
η'		+0.000462	+0.000024
$x-\xi$		−0.49777	+0.39785
$y-\eta$		+0.00719	+0.38000
$x'-\xi'$		+0.007163	+0.006739
$y'-\eta'$		+0.002652	+0.003095
$m \sin M$		9.69703 n	9.59972
$m \cos M$		7.85673	9.57978
$\tan M$		1.84030 n	0.01994
M		270° 49′ 39″	46° 18′ 54″
$\sin M$		9.99995 n	9.85923
$\log m$		9.69708	9.74049
$n \sin N$		7.85509	7.82860
$n \cos N$		7.42357	7.49066
$\tan N$		0.43152	0.33794

	1.8…	…
$\mp\dfrac{L\cos\phi}{n}$	-66.286	+
	m	
τ	$-$ 5.497	–
	d h m	d h
$T+\tau$	22 18 34.503	22 20

Since the value of τ for the beginning is rather large, we comp… …rrection $\delta\tau$ for this phase as follows:

	Beginning.
const. log	0.1100
$\log\xi$	9.4996 n
$\cos d$	9.9742
	4.7838 n
number	-0.0000061
l'	0.0000000
sum	-0.0000061
log (sum)	4.7838 n
$\log(-\tau)$	0.7401
colog n	2.1170
$\sec\phi$	0.0257
	7.6666 n
(1)	-0.0046
$N-\phi$	89° 13′
$\sin(N-\phi)$	0.0000
$\log\xi$	9.4996 n
$\log\xi\sin(N-\phi)$	9.4996 n

	Be…
$\cos(N-\phi)$	
$\log\eta_2$	
$\log\eta_2\cos(N-\phi)$	
$\xi\sin(N-\phi)$	–
$\eta_2\cos(N-\phi)$	–
diff.	–
log (diff.)	
const. log	
$\log\tau^2$	
colog $(n\cos\phi)$	
(2)	+
$(1)+(2)=\delta\tau$	+
τ	–
τ_0	–

The corrected time of beginning is, therefore,

T_0=January 22^d 18^h 34^m.511

Whence we find—

		Beginning.	Ending.
		d h m	d h m
Greenwich Mean Time, January		22 18 34.511	22 20 48.078
λ		− 3 15.276	− 3 15.276
Local Mean Time,	January	22 21 49.787	23 0 3.354

Therefore we have—

		d h m s	
Beginning of the Eclipse,	January	22 21 49 47.2	Local Mean Time.
End of the Eclipse,	January	23 0 3 21.2	

	Beginning.	Ending.
	° ′	° ′
$N \mp \phi$	89 12.7	45 49.1
constant	180 0.0	0 0.0
Angle of position, P	269 12.7	45 49.1

om the north point of the Sun's disk toward the east for direct image.

Pages 564–568 contain the adopted mean places and annual proper motions such stars, as bright as magnitude 6.5, as will be occulted during the year the Moon.

Pages 569–610 contain the elements for the prediction of the times of cultations of stars and planets by the Moon during the current year. The stem of coordinates employed is similar to that already described for eclipses, e fundamental plane passing through the center of the Earth, and being ken perpendicular to the line joining the star and the center of the Moon, at the cone circumscribing the Moon and star is regarded as a cylinder which tercepts the fundamental plane in a circle having the same linear diameter the Moon.

In the columns referring to the star, those headed *Red'ns from 1917.0* give e quantities necessary to reduce the mean place of the star at the beginning 1917 to its apparent place at the time of occultation. These reductions are fficiently accurate to be definitive.

Under the general head, *At Conjunction in R. A.*, are five columns giving rtain quantities for the moment of geocentric conjunction of the Moon and ar in right ascension, as follows:

The *Greenwich Mean Time* is the moment, T, at which the two bodies are geocentric conjunction in right ascension. At that moment the coordinate of the axis of the cylinder on the fundamental plane has the value zero. e column *Hour Angle*, H, gives the common geocentric hour-angle of the oon and star at the same moment, expressed in sidereal time and counted om the meridian of Greenwich—positive toward the west and negative ward the east. Column Y gives the coordinate y of the axis of the cylinder on the fundamental plane at the same moment. Columns x' and y' give e variations of x and y in one hour of mean time. The linear unit in these lumns is the Earth's equatorial radius. The limiting parallels, north and uth, show the extreme limits of latitude within which the occultation will be sible.

T=the instant of geocentric conjunction of Moon and star in right ascension, expre
Greenwich mean time;
H=the Greenwich west hour-angle of the two bodies at that moment;
λ=the longitude west of Greenwich;
$h_0=H-\lambda$=the local hour-angle of the star at the instant T;
δ=the star's declination.

The procedure for each occultation will then be as follows:—

(1) The geocentric coordinates of the place, $\rho \sin \varphi'$ and $\rho \cos \varphi$ to be computed by the formulæ and table given in connection with ec on page 724.

The next step will be to find the approximate instant of apparent junction of the Moon and star as seen from the place, and that may be de from the time of geocentric conjunction by the application of an approxi correction taken from DOWNES's table, printed in the volumes of the Ame Ephemeris for 1882 to 1899. This correction must be reckoned in mean hours, and will be designated by the symbol t. It will have the same sign

When DOWNES's table is not available, the correction may be com from the formulæ—

$$\xi_0=\rho \cos \varphi' \sin h_0$$

$$\xi'=[9.4192]\, \rho \cos \varphi' \cos \tfrac{4}{3}h_0$$

$$t=\frac{\xi_0}{x'-\xi'}$$

By applying t to the Greenwich mean time of geocentric conjunction, as given with the elements, we shall have the Greenwich mean time of local conjunction within a few minutes.

(2) Compute for the instant $T+t$ the following quantities, in which t_0 is the sidereal equivalent of the mean time interval t:

$$\begin{aligned}
\xi &= \rho \cos \varphi' \sin (h_0+t_0) \\
\eta &= \rho \sin \varphi' \cos \delta - \rho \cos \varphi' \sin \delta \cos (h_0+t_0) = \eta_1 - \eta_2 \\
\xi' &= [9.4192]\ \rho \cos \varphi' \cos (h_0+t_0) \\
\eta' &= [9.4192]\ \rho \cos \varphi' \sin \delta \sin (h_0+t_0) = [9.4192]\ \xi \sin \delta \\
x &= x't \\
y &= Y + y't
\end{aligned}$$

Compute also m, M, n, N, and ψ from the equations,

$$\begin{aligned}
m \sin M &= x - \xi \\
m \cos M &= y - \eta \\
n \sin N &= x' - \xi' \\
n \cos N &= y' - \eta' \\
\sin \psi &= [0.5646]\ m \sin (M-N)
\end{aligned}$$

ψ being taken between the limits $\pm 90°$. Finally compute,

$$\tau = \frac{[1.7782]m}{n} \cos (M-N) \mp \frac{[1.2135]}{n} \cos \psi$$

$$\delta\tau = \frac{[6.7591]\tau^2}{n \cos \psi} [\eta_2 \cos (N \mp \psi) - \xi \sin (N \mp \psi)]$$

where the double signs are to be taken negative for an immersion and positive for an emersion. Both τ and $\delta\tau$ thus have two values, which are expressed in minutes of time, and in order to distinguish them let those pertaining to immersion be designated, respectively, τ' and $\delta\tau'$, while those pertaining to emersion are designated τ'' and $\delta\tau''$. We then have for the Greenwich mean times of the phases,

$$\begin{aligned}
\text{Instant of immersion} &= T+t+\tau' + \delta\tau' \\
\text{Instant of emersion} &= T+t+\tau'' + \delta\tau''
\end{aligned}$$

These expressions are practically exact, as the corrections $\delta\tau$ seldom amount to so much as 1.5 minutes, and whenever an inaccuracy of that magnitude is permissible they may be omitted. As a check upon the results it will be advisable to compute ξ, η, x, and y for the times of immersion and emersion finally obtained. If these times are correct, the quantities in question will fulfill the condition,

$$\sqrt{(x-\xi)^2 + (y-\eta)^2} = 0.2725$$

If $\log m \sin (M-N) > 9.4354$, $\sin \psi$ will be numerically greater than unity, and no occultation is to be expected at the given place; but a very brief one may occur if the excess of the computed distance over the Moon's semidiameter happens to be within the errors of the ephemerides of the Moon and star.

The position-angle of the line from the Moon's center to the star, at the time of contact, is reckoned from the north point toward the east, and designated by the symbol P. It is computed from the formulæ—

$$\begin{aligned}
& P = N - \psi + \delta P && \text{for immersion,} \\
\textit{or}\quad & P = N + \psi + \delta P \pm 180° && \text{for emersion,}
\end{aligned}$$

$$r = r' - C$$

where C is computed from the expression,

consult any one of the volumes in question.

As an example of an isolated occultation, we will compute that ‹
Leonis on March 6, 1917, for Evanston, Ill., whose position is—

$$\varphi = +42^\circ \ 3' \ 33''.4$$
$$\lambda = +\ 5^h \ 50^m \ 42^s.3$$

and whose geocentric coordinates are—

$$\rho \sin \varphi' = 9.8237$$
$$\rho \cos \varphi' = 9.8713$$

From the elements on page 576 we have,

$$
\begin{array}{rrr}
 & \text{h} & \text{m} \\
T = & 17 & 10.0 \\
H = + & 6 & 13.6 \\
\end{array}
$$

and $\lambda_1 = H - \lambda = +\ 0 \ 22.9$

From the formulæ on page 730, we find the correction, t, to the Gr
mean time of geocentric conjunction, T, to be about $+0^h \ 14^m.4$; there
Greenwich mean time of apparent conjunction is—

$$T + t = \text{March } 6^d \ 17^h \ 24^m.4$$

89 B. Leonis.	Apparent Declination. ° ′	G. M. T. of ☌ d h m	Hour Angle. h m	Y	x'
	+8 42.4	Mar. 6 17 10.0	+6 13.6	+0.7506	0.5032

$T+t$	Mar. 6^d 17^h $24^m.4$
h_0	+ 0 22.9
t_0	+ 0 14.4
h_0+t_0	+ 0 37.3
$\rho \cos \varphi'$	9.8713
$\sin (h_0+t_0)$	9.2096
$\log \xi$	9.0809
ξ	+0.1205
$\rho \sin \varphi'$	9.8237
$\cos \delta$	9.9950
$\log \eta_1$	9.8187
η_1	+0.6587
$\rho \cos \varphi'$	9.8713
$\sin \delta$	9.1801
$\cos (h_0+t_0)$	9.9942
$\log \eta_2$	9.0456
η_2	+0.1111
$\eta_1-\eta_2=\eta$	+0.5476
const. log	9.4192
$\rho \cos \varphi' \cos (h_0+t_0)$	9.8655
$\log \xi'$	9.2847
ξ'	+0.1926
const. log	9.4192
$\xi \sin \delta$	8.2610
$\log \eta'$	7.6802
η'	+0.0048
$\log x'$	9.7018
$\log t$	9.3802
$\log x$	9.0820
x	+0.1208
$\log y'$	9.3464 n
$\log y't$	8.7266 n
$y't$	−0.0533
Y	+0.7506
y	+0.6973

$x-\xi$	+0.0003
$y-\eta$	+0.1497
$x'-\xi'$	+0.3106
$y'-\eta'$	−0.2268
$m \sin M$	6.4771
$m \cos M$	9.1752
$\tan M$	7.3019
M	0° 7′
$\cos M$	0.0000
$\log m$	9.1752
$n \sin N$	9.4922
$n \cos N$	9.3556 n
$\tan N$	0.1366 n
N	126° 8′
$\sin N$	9.9072
$\log n$	9.5850
const. log	0.5646
$\log m$	9.1752
$\sin (M-N)$	9.9079 n
$\sin \psi$	9.6477 n
ψ	−26° 23′
const. log	1.7782
$\log \frac{m}{n}$	9.5902
$\cos (M-N)$	9.7694 n
	1.1378 n
$\frac{[1.7782]m}{n} \cos (M-N)$	+13.73
const. log	1.2135
colog n	0.4150
$\cos \psi$	9.9522
	1.5807
$\mp \frac{[1.2135] \cos \psi}{n}$	∓38.08
τ for immersion	−24.35
τ for emersion	+51.81

ιe computation of $\delta\tau$ for the two contacts is as follows:

	Immersion.	Emersion.
$N \mp \psi$	152° 31′	99° 45′
$\cos (N \mp \psi)$	9.9480 n	9.2288 n
$\log \eta_2$	9.0456	9.0456
log (1)	8.9936 n	8.2744 n
(1)	−0.0985	−0.0188
$\sin (N \mp \psi)$	9.6642	9.9937
$\log \xi$	9.0809	9.0809
log (2)	8.7451	9.0746
(2)	+0.0556	+0.1187
(1)−(2)	−0.1541	−0.1375
log [(1)−(2)]	9.1878 n	9.1383 n
const. log	6.7591	6.7591
$\log \tau^2$	2.7730	3.4288
colog ($n \cos \psi$)	0.4628	0.4628
$\log \delta\tau$	9.1827 n	9.7890 n

computed with elements and formulæ given on page xiii, and their sums given in the second and third columns, respectively, the physical libra being given separately in the fourth and fifth columns. The Sun's sel graphic colongitude (90° − longitude) and latitude and the position-angle the *Moon's* axis, *C*, in the sixth, seventh, and eighth columns, respectively, *all been* corrected for the effect of physical libration.

When the libration in longitude is positive, the mean center of the disk is
placed toward the east—that is, the region thus exposed to view is on the
st limb—and when the libration in latitude is positive the mean center of
disk is displaced toward the south—that is the region thus exposed to
w is on the north limb.

The altitude of the Sun, A, at any given time above the horizon of any
int on the Moon whose selenographic longitude and latitude, λ and β, are
own, may be computed from the following formula, the Sun's selenographic
gitude and latitude being denoted by $l_{\odot}$ and $b_{\odot}$, respectively:

$$\sin A = \sin b_{\odot} \sin \beta + \cos b_{\odot} \cos \beta \cos (l_{\odot} - \lambda)$$

Pages 624–625 contain the data with reference to the illuminated disks of
rcury and Venus. The angle θ is the angle which the arc of the great circle
m the planet to the Sun makes with the arc from the planet toward the west,
asured in the direction west, north, east, south. It is measured from 0° to
)°. We may also regard θ as expressing the angle which the line of cusps
kes with the meridian, the positive direction of the meridian being toward
north, and the positive direction of the line of cusps that in which a person
lowing this line would have the illuminated portion of the disk on his right.

Pages 626–627 contain the *Ephemeris for Physical Observations of Mars.*
e quantities here given have been corrected for aberration, so that in using
em they should be interpolated to the actual time of observation.

P = the position-angle of the axis of rotation measured eastward from the north point of the disk.

$\oplus$, $A_{\odot}$ = the planetocentric right ascensions of the Earth and Sun, respectively, measured in the plane of the planet's equator from its vernal equinox.

$\oplus$, $D_{\odot}$ = the planetocentric declinations of the Earth and Sun, respectively, referred to the planet's equator.

$\odot_{♂}$ = the planetocentric longitude of the Sun measured in the plane of the planet's orbit from its vernal equinox.

k = the ratio of the area of the illuminated portion of the apparent disk to the area of the entire apparent disk regarded as circular.

i = the angle between the Sun and the Earth as seen from the planet.

q = the angular value of the greatest defect of illumination as seen from the Earth.

Q = the position-angle of the radius of the disk which passes through the point of greatest defect of illumination—that is, of the radius perpendicular to the line joining the cusps. It is measured eastward from the north point of the disk.

The column headed *Central Meridian* contains the longitude of the meridian
ich bisects the disk, measured from the adopted zero meridian.

The columns headed *Mean Time of Transit of Zero Meridian* contain the
eenwich Mean Time of every transit of the zero meridian across the actual
nter of the disk.

Pages 628–631 contain the *Ephemeris for Physical Observations of Jupiter.*

The columns headed *Central Meridian* contain the longitudes of the merid-
n which bisects the disk, measured from the adopted zero meridian of System I
d System II, respectively.

The column headed *Correction for Phase* contains the corrections to be
plied to the longitudes of the central meridian to obtain the longitudes of
e meridian bisecting the illuminated disk.

declination between Jupiter and Satellites VI and VII, and th
of the Satellites I–IV together with their configurations.

Page 658 contains the *Magnitude of Saturn* and the *Element*

a, b = the major axis and minor axis, respectively, of the outer ellipse of

P = the position angle of the northern semi-minor axis of the rings, m north, positive towards the east.

B = the Saturnicentric latitude of the Earth referred to the plane of t towards the north.

$U+180°$ = the Saturnicentric longitude of the Earth measured in the plane their ascending node on the Earth's equator.

ω = the distance in the plane of the rings from their ascending node on th to their ascending node on the ecliptic.

B' = the Saturnicentric latitude of the Sun referred to the plane of t towards the north.

$U'+180°$ = the Saturnicentric longitude of the Sun measured in the plane of th ascending node on the ecliptic.

Pages 659–667 contain, concerning the *Satellites of Saturn*, t the orbits of the seven inner satellites, the times of elongation for satellites, the differences in right ascension and declination be and Phœbe, the ninth satellite, and tables for predicting the p and distances from the center of the planet of the first eight sat

Page 668 contains the diagram of the orbits of the satelli together with the times of their elongations.

Pages 669–670 contain tables for predicting the position-a tances from the center of the planet of the satellites of Uranus

Page 671 contains the diagram of the orbit of the satellit together with the times of its elongations.

Pages 672–673 contain the *Phenomena*, or the configuratio
Moon, and planets, expressed in the symbols of page xx. The p

Pages 674–683 contain the *Positions of Observatories*, together with a list he authorities from which the positions are obtained. The tabular arrangent is self-explanatory.

Page 684 contains two examples in the computation of lunar distances, ch are inserted because lunar distance tables are no longer published.

Pages 685–709 contain a series of tables numbered from I to VII.

Table I—*For Finding the Latitude by an Observed Altitude of Polaris.*

Table II—For converting *Sidereal into Mean Solar Time.*

Table III—For converting *Mean Solar into Sidereal Time.*

Table IV—For Finding the *Azimuth of Polaris at All Hour Angles.*

Table V—For Finding the *Azimuth of Polaris at Elongation.*

Table VI—*For Finding the Times of Upper and Lower Culmination of aris.*

Table VII—For finding the *Apparent Place, Time of Upper Culmination, Time Interval between Upper Culmination and Elongation*, of Polaris.

39396°—1917—47

GENERAL INDEX.